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The Celebrated Niagara Suspension Bridge.

For many years it was a question discussed by the merchants and the people on each side of the line which divides the United States from the British possessions, how to make a permanent and safe connection between the opposite shores of the Niagara river. At length, in 1855, the problem was solved by the erection of the suspension bridge, which is to this day unsurpassed by any other similar structure in this or any other country.

The bridge is located about two miles below the falls, and spans the river at a hight of nearly 250 feet above the water. It is supported by four wire cables, nine-and-a-quarter inches diameter, which pass over towers erected on each side of the river. From center to center these towers are 800 feet apart. 14,560 wires were used in the cables, their united strength being estimated at 12,000 tuns. It is a railway and ordinary passenger traffic bridge combined, the carriage and foot ways being twenty-eight feet below the railway track. Its rigity and strength may be conceived when it is stated that under the passage of heavy trains the deflection is less than four inches.

Mr. John A. Roebling was the engineer, who will superintend the erection of the proposed bridge which is to connect New York and Brooklyn.

THE SUSPENSION BRIDGE ACROSS THE NIAGARA.

TELEGRAPHIC METEOROMETERS.—Prof. Wheatstone has devised a new class of instruments for taking observations in stations which for any cause are not accessible for very long periods. The telegraphic thermometer, a type of this class, consists essentially of two parts; the first is the magnetic-motor, constructed on a plan similar to that used by the inventor in his alphobetical magnetic telegraph, and is so arranged that by turning a handle the lever at the other extremity of the line will describe by regular steps a complete circle. The second part conslsts of a metallic thermometer, in which the unequal expansion of two different metals is made to move a lever or pin around a graduated circle which marks the degrees of temperature. The two parts are in such proximity that the telegraphic lever in passing around the circle must, at some point, come in contact with the pin, which is moved by means of the expanding or contracting metals. This contact breaks one circuit and completes anotber, and thus transmits to the other extremity of the telegraphic line information of the partiticular degree of heat at that instant indicated by the thermometer. This thermometer is not self-recording, but responds with accuracy when ever questioned.

MONEY'S IMPROVEMENT IN UMBRELLAS.

The insertion of the ordinary wire spring commonly used on umbrellas and parasols necessitates a mortise in the handle, which by being cut nearly through the stock diminishes its strength and makes that portion comparatively weak at the point which should be the strongest.

The slide, in which are pivoted the inner ends of the ribs, as seen in the engraving, is similar to that in ordinary use. It is shown in both the views in section. On a projection on one side of it is pivoted a double lever cam with a thumb piece on each arm of the lever. When, as in the engraving, the lower end of the lever is pressed down the boss of the eccentric or cam impinges rigidly and firmly on the surface of the handle or stick and the umbrella can be held open. On the contrary, when the upper end is forced in toward the staff the pressure of the boss of the eccentric is released from the stick and the umbrella can be readily closed, the slide moving freely on the stick. This position is seen in the small section marked A.

The patent for this device, obtained through the Scientific American Patent Agency, Oct. 29, 1867, is owned by William Money and Edgar McCloud, either of whom may be addressed relative to the sale of rights, etc., at Paterson, N. J.

The First Steam Fire Ship.

Edward Thomason, of Birmingham, England, laid before the Admiralty, in 1796, a model of a vessel propelled by paddle wheels and a steam engine intended for use as a fire ship. The rudder was also to be operated by the engine, the powder and combustibles also to be fired by the same means, as soon as the driving shaft had accomplished a certain number of revolutions. No person was to accompany the vessel. The distance from the English blockading fleet to the French fleet in the harbor being known, also the course of the channel, the steam fire ship was to be adjusted and started. After the engine had made a given number of turns, the rudder would be moved and the vessel's direction changed according to the channel, and so on until the paddles having made the total number of revolutions required to carry the ship into the middle of the hostile fleet, then presto, click, the explosion was to take place and the unsuspecting enemy were to be set on fire or blown sky-high. But in those days the Admiralty did not believe in steam power and so the novel fire ship was never built.

ADDING to the width of a belt and of the faces of the pulleys, increases immensely its power of conveying force. A wide belt is always better than a narrow one strained to its utmost capacity.

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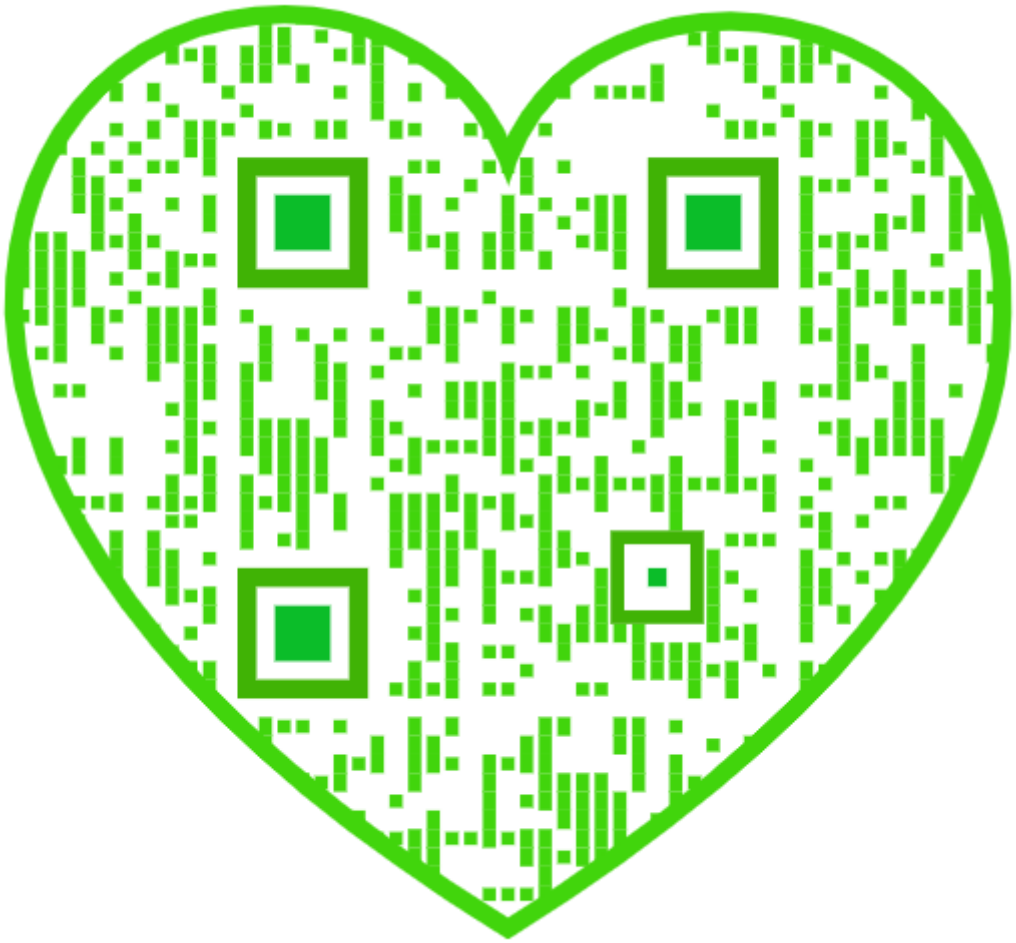

THE AMERICAN TORPEDO BOAT OF 1776.

The historical records of our Revolutionary war contain notices of the attempt made in 1776 to destroy the British fleet then anchored in the harbor of New York, by means of a submarine apparatus. The following details of the construction of the torpedo vessel, its operations and final loss, are from the pen of the inventor himself, D. Bushnell, of Connecticut, and were communicated by him many years ago, to the American Philosophical Society, from whose records we transcribe them. This we believe was the first submarine boat ever constructed. Every part seems to have been well considered, and the whole exhibits a degree of ingenuity quite remarkable for those early days of invention.

The external shape of the submarine vessel bore some resemblance to two upper tortoise shells of equal size, joined together; the place of entrance into the vessel being represented by the opening made by the swell of the shells, at the head of the animal. The inside was capable of containing the operator, and air sufficient to support him thirty minutes without receiving fresh air. At the bottom, opposite to the entrance, was fixed a quantity of lead for ballast. At one edge, which was directly before the operator, who sat upright, was an oar for rowing forward or backward. At the other edge was a rudder for steering. An aperture, at the bottom, with its valve, was designed to admit water, for the purpose of descending; and two brass forcing-pumps served to eject the water within, when necessary for ascending. At the top there was likewise an oar, for ascending or descending, or continuing at any particular depth. A water gage, or barometer, determined the depth of descent, a compass directed the course, and a ventilator within supplied the vessel with fresh air, when on the surface.

The entrance into the vessel was elliptical, and so small as barely to admit a person. This entrance was surrounded with a broad elliptical iron band, the lower edge of which was let into the wood of which the body of the vessel was made, in such a manner as to give its utmost support to the body of the vessel against the pressure of the water. Above the upper edge of this iron band there was a brass crown, or cover, resembling a hat with its crown and brim, which shut watertight upon the iron band; the crown was hung to the iron band with hinges, so as to turn over sidewise, when opened. To make it perfectly secure when shut, it might be screwed down upon the band by the operator, or by a person without.

There were in the brass crown three round doors, one directly in front, and one on each side, large enough to put the hand through. When open, they admitted fresh air; their shutters were ground perfectly tight into their places with emery, hung with hinges, and secured in their places when shut. There were likewise several small glass windows in the crown, for looking through, and for admitting light in the day time, with covers to secure them. There were two air pipes in the crown. A ventilator within drew fresh air through one of the air pipes, and discharged it into the lower part of the vessel; the fresh air introduced by the ventilator expelled the impure light air through the other air pipe. Both air pipes were so constructed, that they shut themselves whenever the water rose near their tops, so that no water could enter through them, and opened themselves immediately after they rose above the water.

The vessel was chiefly ballasted with lead fixed to its bottom; when this was not sufficient, a quantity was placed within, more or less, according to the weight of the operator; its ballast made it so stiff, that there was no danger of oversetting. The vessel, with all its appendages, and the operator, was of sufficient weight to settle it very low in the water. About two hundred pounds of the lead, at the bottom for ballast, would be let down forty or fifty feet below the vessel; this enabled the operator to rise instantly to the surface of the water, in case of accident.

When the operator would descend, he placed his foot upon the top of a brass valve, depressing it, by which he opened a large aperture in the bottom of the vessel, through which the water entered at his pleasure; when he had admitted a sufficient quantity, he descended very gradually; if he admitted too much, he ejected as much as was necessary to obtain an equilibrium, by the two brass forcing pumps, which were placed at each hand. Whenever the vessel leaked, or he would ascend to the surface, he also made use of these forcing pumps. When the skillful operator had obtained an equilibrium, he could row upward, or downward, or continue at any particular depth, with an oar, placed near the top of the vessel, formed upon the principle of the screw, the axis of the oar entering the vessel; by turning the oar one way he raised the vessel, by turning it the other way he depressed it.

A glass tube, eighteen inches long, and one inch in diameter, standing upright, its upper end closed, and its lower end, which was open, screwed into a brass pipe, through which the external water had a passage into the glass tube, served as a water-gage or barometer. There was a piece of cork, with phosphorus on it, put into the water-gage. When the vessel descended the water rose in the water-gage, condensing the air within, and bearing the cork, with its phosphorus, on its surface. By the light of the phosphorus, the ascent of the water in the gage was rendered visible, and the depth of the vessel under water ascertained by a graduated line.

An oar, formed upon the principle of the screw, was fixed in the fore part of the vessel; its axis entered the vessel, and being turned one way, rowed the vessel forward, but being turned the other way, rowed it backward; it was made to be turned by the hand or foot.

A rudder, hung to the hinder part of the vessel, commanded it with the greatest ease. The rudder was made very elastic, and might be used for rowing forward. Its tiller was within the vessel, at the operator's right hand, fixed at a right angle, on an iron rod, which passed through the side of the vessel; the rod had a crank on its outside end, which commanded the rudder, by means of a rod extending from the end of the crank to a kind of tiller, fixed upon the left hand of the rudder. Raising and depressing the first-mentioned tiller turned the rudder as the case required.

A compass, marked with phosphorus, directed the course, both above and under the water; and a line and lead founded the depth when necessary.

The internal shape of the vessel, in every possible section of it, verged toward an ellipsis, as near as the design would allow, but every horizontal section, although elliptical, yet as near to a circle as could be admitted. The body of the vessel was made exceedingly strong; and to strengthen it as much as possible, a firm piece of wood was framed, parallel to the conjugate diameter, to prevent the sides from yielding to the great pressure of the incumbent water, in a deep immersion. This piece of wood was also a seat for the operator.

Every opening was well secured. The pumps had two sets of valves. The aperture at the bottom, for admitting water, was covered with a plate, perforated full of holes to receive the water, and prevent anything from choking the passage, or stopping the valve from shutting. The brass valve might likewise be forced into its place with a screw, if necessary. The air pipes had a kind of hollow sphere, fixed round the top of each, to secure the air pipe valves from injury; these hollow spheres were perforated full of holes, for the passage of the air through the pipes; within the air pipes were shutters to secure them, should any accident happen to the pipes, or the valves on their tops.

Wherever the external apparatus passed through the body of the vessel, the joints were round, and formed by brass pipes, which were driven into the wood of the vessel, the holes through the pipes were very exactly made, and the iron rods, which passed through them, were turned in a lathe to fit them; the joints were also kept full of oil, to prevent rust and leaking. Particular attention was given to bring every part necessary for performing the operations, both within and without the vessel, before the operator, and as conveniently as could be devised; so that everything might be found in the dark, except the water-gage and the compass, which were visible by the light of the phosphorus, and nothing required the operator to turn to the right hand, or to the left, to perform anything necessary.

THE MAGAZINE.

In the fore part of the brim of the crown of the submarine vessel was a socket, and an iron tube, passing through the socket; the tube stood upright, and could slide up and down in the socket, six inches; at the top of the tube was a wood screw, fixed by means of a rod, which passed through the tube, and screwed the wood screw fast upon the top of the tube; by pushing the wood screw up against the bottom of a ship, and turning it at the same time, it would enter the planks; driving would also answer the same purpose; when the wood screw was firmly fixed, it could be cast off by unscrewing the rod, which fastened it upon the top of the tube.

Behind the submarine vessel was a place above the rudder for carrying a large powder magazine; this was made of two pieces of oak timber, large enough, when hollowed out, to contain one hundred and fifty pounds of powder, with the apparatus used in firing it, and was secured in its place by a screw, turned by the operator. A strong piece of rope extended from the magazine to the wood screw above mentioned, and was fastened to both. When the wood screw was fixed, and to be cast off from its tube, the magazine was to be cast off likewise by unscrewing it, leaving it hanging to the wood screw; it was lighter than the water, that it might rise up against the object, to which the wood screw and itself were fastened.

Within the magazine was an apparatus, constructed to run any proposed length of time, under twelve hours; when it had run out its time, it unpinioned a strong lock resembling a gun lock, which gave fire to the powder. This apparatus was pinioned, that it could not possibly move, till, by casting off the magazine from the vessel, it was set in motion.

The skilful operator could swim so low on the surface of the water as to approach very near a ship in the night, without fear of being discovered, and might, if he chose, approach the stem or stern above water, with very little danger. He could sink very quickly, keep at any depth he pleased, and row a great distance in any direction he desired, without coming to the surface, and when he rose to the surface, he could soon obtain a fresh supply of air, when, if necessary, he might descend again and pursue his course.

EXPERIMENTS.

In the first essays with the submarine vessel I took care to prove its strength to sustain the great pressure of the incumbent water, when sunk deep, before I trusted any person to descend much below the surface; and I never suffered any person to go under water without having a strong piece of rigging made fast to it, until I found him well acquainted with the operations necessary for his safety. After that I made him descend, and continue at particular depths, without rising or sinking, row by the compass, approach a vessel, go under her, and fix the wood screw mentioned before into her bottom, etc., until I thought him sufficiently expert to put my design into execution.

I found, agreeably to my expectations, that it required many trials to make a person of common ingenuity a skilfull operator; the first I employed was very ingenious, and made himself master of the business, but was taken sick in the campaign of 1776, at New York, before he had an opportunity to make use of his skill, and never recovered his health sufficiently afterward.

ATTEMPT TO SINK A BRITISH SHIP OF WAR.

After various attempts to find an operator to my wish, I sent one, who appeared more expert than the rest, from New York, to a fifty gun ship, lying not far from Governor's Island. He went under the ship, and attempted to fix the wooden screw into her bottom, but struck, as he supposes, a bar of iron, which passes from the rudder hinge, and is spiked under the ship's quarter. Had he moved a few inches, which he might have done, without rowing, I have no doubt but he would have found wood where he might have fixed the screw; or, if the ship were sheathed with copper, he might easily have pierced it; but not being well skilled in the management of the vessel, in attempting to move to another place, he lost the ship; after seeking her in vain, for some time, he rowed some distance, and rose to the surface of the water, but found daylight had advanced so far, that he durst not renew the attempt. He says that he could easily have fastened the magazine under the stern of the ship, above water, as he rowed up to the stern, and touched it before he descended. Had he fastened it there, the explosion of one hundred and fifty pounds of powder (the quantity contained in the magazine) must have been fatal to the ship. In his return from the ship to New York he passed near Governor's Island, and thought he was discovered by the enemy on the island; being in haste to avoid the danger he feared, he cast off the magazine, as he imagined it retarded him in the swell, which was very considerable. After the magazine had been cast off one hour, the time the internal apparatus was set to run, it blew up with great violence.

Afterward, there were two attempts made in the Hudson River, above the city, but they effected nothing. One of them was by the afore-mentioned person. In going toward the ship, he lost sight of her, and went a great distance beyond her; when he at length found her, the tide ran so strong, that, as he descended under water for the ship's bottom, it swept him away. Soon after this the enemy went up the river, and pursued the boat which had the submarine vessel on board, and sunk it with their shot. Though I afterward recovered the vessel, I found it impossible, at that time, to prosecute the design any farther. I had been in a bad state of health, from the beginning of my undertaking, and was now very unwell; the situation of public affairs was such, that I despaired of obtaining the public attention, and the assistance necessary. I was unable to support myself and the persons I must have employed, had I proceeded. Beside, I found it absolutely necessary that the operators should acquire more skill in the management of the vessel, before I could expect success; which would have taken up some time, and made no small additional expense. I therefore gave over the pursuit for that time, and waited for a more favorable opportunity, which never arrived.

Alabaster and Plaster of Paris.

Alabaster is a compact gypsum, and occurs massive, with a compact fracture; it is translucent; has a glimmering luster, and its colors are white, reddish, or yellowish.

The purest kinds of this mineral are used in Italy for vases, cups, candlesticks, and other ornaments. It is found at Castelino, in Tuscany, thirty-five miles from Leghorn, at two hundred feet below the surface of the earth.

The yellow variety, called by the Italians *alabastro agatato*, is found at Sienna; another variety of a bluish color, obtained at Guercieto, is remarkably beautiful, being marked with variegated shades of purple, blue, and red. These alabasters are carbonates of lime.

The principal manufactory of alabaster ornaments is at Valterra, thirty-six miles from Leghorn, where about five thousand persons live by this kind of labor. In making, they require great care, and must be preserved from dust, as the alabaster is difficult to clean. Talcum, commonly called French chalk, will remove dirt, but the best mode of restoring the color, is to bleach the alabaster on a grass plat. Gum water is the only cement for uniting broken parts.

Plaster of Paris is likewise a compact gypsum, but contains a small portion of carbonic acid, which makes it effervesce when treated with acids. It was formerly exported only from Montmartre, near Paris, hence its name; it is much used in ornamenting rooms in stucco, in taking impressions of medals, in casting statues, busts, vases, timepiece stands, candelabras, obelisks, and for many other purposes.

The common plaster of Paris is ground after being calcined; and in this condition it has the property of forming a pliable mass with water, which soon hardens, and assumes the consistency of stone.

Oriental alabaster is not a sulphate but a true carbonate of lime, and on account of its peculiar tint and transparency, and as it appears that it was formed similar to stalagmite, it was called by the ancients, alabaster.

M. KRUPP is about to construct, at his works at Essen, a single-acting steam hammer, far exceeding in size any now in existence. The design for this hammer—which will have a head weighing 120 tuns—have already been prepared, and the patterns are now in hand. At present, the largest hammer at M. Krupp's enormous establishment is one with a 50-tun head, falling nine feet, six inches. This is a single-acting hammer—the only one on the works, all the others being double-acting. The smaller hammers have heads varying from twenty-five tuns downwards. In addition to these, M. Krupp has also some peculiar tilt-hammers, in which a steam cylinder is placed between the head and fulcrum of the hammer, and the piston working in this cylinder is directly coupled to the hammer shaft by a connecting rod.

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The Wondrous Textile Fabrics of Hindoostan.

In the manufacture of muslin the Hindoos surpass all other people, as they do in the manufacture of the Cashmere shawl. There is a class of muslin termed "woven air," the fabric of which is so marvelously fine that the Hindoos themselves are fond of relating all kinds of strange theories respecting it.

Mr. Bolt, in his "Consideration of the Affairs of India," speaking of the Dacca muslins, says that according to report, the Emperor Aurungzebee once "was angry with his daughter for showing her skin through her clothes, whereupon the young princess remonstrated in her justification, that she had seven *japlithz*, or suits, on; another tale was to the effect that, "in the Nabob Allaverdy Kahwan's time, a weaver was chastised and turned out of the city of Dacca for his neglect in not preventing his cow from eating up a piece of "Abrovan," which he had spread and left upon the grass—the muslin, of course, being so fine that the animal could not see it upon the herbage.

So delicate is the manufacture of the short staple of the Dacca cotton, that it can only be woven into yarn at certain times of the day. The morning is generally so employed before the dew has left the grass; if spinning is carried on after that time, the spinner, who is always a woman under thirty years of age, spins the yarn over a pan of water, the evaporation of which affords sufficient moisture to prevent the fibers from becoming too brittle to handle. Delicate as the muslin is, it will wash, which European muslins will not. The durability of the Dacca muslin, notwithstanding its surprising fineness—a piece of "evening dew" one yard wide and four yards long, only weighing 556 grains—is said to be owing to the greater number of twists given to the Dacca yarn, as compared with the finest muslin yarns of England or France. The time taken to spin and weave the threads in a piece of "woven air" is very great; the reader will not therefore be surprised to hear that it sells at the rate of a guinea a yard.

The "Abrovan," or "Running Water," is considered the second class of muslin; "Sabaum," or "Evening Dew," is the third quality. It is so called because it is so fine that it can scarcely be distinguished from dew upon the grass. There are several other very fine Dacca muslins that are known by distinctive names, but these so poetically designated are the most famous. The Daghdhobees, who remove iron mold from this precious material, use the juice of the amrood plant for that purpose; and to remove other spots or stains a composition of ghel, lime, and mineral alkali. There are Mahommedans who also repair this "woven air" with a skill equal to that of the Hindoo, who weaves it. For instance, it is said that an expert Rafuger, or darner, "can extract a thread twenty yards long from a piece of the finest muslin of the same dimensions, and replace it with one of the finest quality." It is said that they execute their finest work under the influence of opium.

A still more exquisite and expensive work of the Indian loom is the figured muslin. A piece of this fabric measuring twenty yards, made in 1776, cost as much as £56. The splendid yet subdued effect of weaving gold and silver thread into the different fabrics made in India has never even been approached by Europeans. Some of their silks have a sheen upon them like the breast of a pigeon, or indeed of the Impeyan pheasant. In nature we never find that even the most splendid effects offend the eye by appearing harsh. The Indian artist seems to have caught the very art there is in nature, and he uses his gold and silver with a caution, a prodigality, and an economy fitted for the occasion. The native never throws away gold where it will not be seen. Thus on the turban cloth only the end that hangs down by the neck is thus ornamented; in the waistcloth the fringed end, etc. The gold thread is so very pure that it never tarnishes, aud it washes just as well as the other threads of the garment. The thread of the precious metals is called kullabutoon, and is manufactured wholly by hand.

The embroidery in the woven garments in which this absolutely pure gold is employed never tarnishes—a perfection to which European fabricators have not yet attained.

[We have seen a vail brought by Gov. Thomas H. Seymour —who was for six years our Minister to St. Petersburg—from Tartary, which, although one yard wide and three long, would float in the atmosphere for an appreciable time before descending to the floor.—EDS.

The Limits of the Human Ear.

Prof. Tyndall, in a course of lectures on "Sound," delivered before the Royal Institution of Great Britain, states that the perception by the ear of musical sounds and the range of hearing in general is limited by quite narrow bounds.

Savart fixed the lower limit of the human ear at eight complete vibrations a second; and to cause these slowly recurring vibrations to link themselves together, he was obliged to employ shocks of great power. By means of a toothed wheel and an associated counter, he fixed the upper limit of hearing at 24,000 vibrations a second. Helmholtz has recently fixed the lower limit at 16 vibrations, and the higher at 38,000 vibrations, a second. By employing very small tuning-forks, the late M. Depretz showed that a sound corresponding to 38,000 vibrations a second is audible. Taking the limits assigned by Helmholtz, the entire range of the human ear embraces about 11 octaves. But all the notes comprised within these limits cannot be employed in music. The practical range of musical sounds is comprised between 40 and 4,000 vibrations a second, which amounts, in round numbers, to 7 octaves. "The deepest tone of orchestra instruments is the E of the double bass, with 41¼ vibrations. The new pianos and organs go generally as far as C^1 with 33 vibrations; new grand pianos may reach A^{11} with with 27½ vibrations. In large organs a lower octave is introduced reaching to C^{11} with 16½ vibrations. But the musical character of all these tones under E is imperfect, because they are near the limit where the power of the ear to unite the vibrations to a tone ceases. In highth the pianoforte reaches to a^{iv} with 3,520 vibrations, or sometimes to c^{v} with 4,224 vibrations. The highest note of the orchestra is probably the d^{v} of the piccolo flute, with 4,752 vibrations."

Rule of the Road for Steamers.

The following lines seem to be admirably adapted for the purpose of preventing collisions at sea. They are calculated to imprint upon the minds of mariners the "Rules of the Road for Steamers," more vividly and indelibly than any other process would effect. The author will achieve as great an amount of fame as he who paraphrased the days of the months, and the number of days in each :—

1. Two steamships meeting end on, or nearly end on.

Meeting steamers do not dread
When you see three lights ahead!
Port your helm, and show your Red.

2. Two steamships passing.

For steamers passing, you should try
To keep this maxim in your eye:—
Green to Green—or, Red to Red—
Perfect safety—go ahead!

3. Two steamships crossing. This is the real position of danger. The steamship that has the other on her own starboard side shall keep out of the way of the other. There is nothing for it but good look-out, caution, and judgment.

If to starboard Red appear,
'Tis your duty to keep clear;
Act as judgment says is proper:—
Port—or starboard—back—or, stop her!

But when on your Port is seen
A steamer with a light of Green,
There's not so much for you to do,
The Green light must keep clear of you.

4. All ships must keep a good look-out, and steamships must stop and go astern, if necessary.

Both in safety and in doubt
Always keep a good look-out;
Should there not be room to turn,
Stop your ship, and go astern.

—*Mechanics' Magazine.*

Subjugating an Elephant.

Recently, a Cincinnati paper says, a circus elephant, thirty-six years old, 10,000 pounds weight, and named Tippoo Saib, while in winter quarters at Connorsville, Indiana, became unruly on account of a change of his keeper, and went to war against all mankind. He would allow no one in his quarters, and struck at every one who approached him with his trunk and tusks most violently. His keeper determined to subdue him, and the process and result are thus described: The new keeper, with nine assistants, had fully equipped himself with chains and cables for tying, and spears and pitchforks for subduing Tippoo. The first thing done was to fasten a brick-bat to the end of a rope and throw it over the end of the tusk-chain, which latter is fastened to one leg and one tusk. By means of this rope a 20-tun cable chain (formerly used to subdue the famous Hannibal) was slip-noosed around the tusk. Next, an excavation three feet deep was made under the sill of the house, and while the elephant's attention was attracted to the other side of the room by a pail of water poured into his trough, the cable chain was passed through the excavation and fastened to heavy stakes outside. All this time the infuriated monster struck all around him with terrible ferocity, and tugged at his chain with incredible momentum. The next thing accomplished was the snaring of his hind legs. This was consummated by the slinging of fresh ropes around those two stately pillars of elephant flesh, bone and muscle, and finally, by the stealthy strategy of the keeper and another man, these ropes were fastened to stumps outside. The elephant was now sufficiently pinioned to allow the order, "Charge pitchforks," to be given. Ten men, armed with these ugly implements of offense, plunged them into the rampaging beast, taking care, of course, to avoid penetrating his eyes or joints. The tenderest spot in an elephant is just behind the fore legs, and that locality was prodded unmercifully. By means of a hooked spear sunk in his back, Tippoo was brought to his knees, but he surged up again with such awful strength that he swept his tormentors off their feet and made his chains whistle like fiddle-strings. After an hour's fighting he was brought down on his side, but for two hours longer he tugged at his chains with frenzied obstinacy. He pulled so hard at times that his hind legs were straight out behind him, and three feet off the ground. At the end of three hours the giant gave in by trumpeting, which is the elephant's way of crying enough. The moment this peculiar cry was heard the battle ceased. The keeper made Tippoo get up and lie down a number of times, and he was as obedient to the word of command as a gentle pony. The animal was then groomed and rubbed off with whisky. He allowed all manner of liberties without so much as flapping an ear. He was a subjugated elephant.

Scotland's Pebbles.

Scotland can boast of her pebbles and fine specimens of quartz found in the form of perfect crystals, varying in color from pure white to amber and a deep brown. Our native pebbles are of singular conformations, and are of all colors—red, green, grey, auburn, yellow, and also of the jasper kind with a mixture of colors. A curious phenomenon connected with the color of pebbles is, that each color is found only in distinct localities.

Pebbles are found in every county of Scotland, but more plentifully in Ayrshire, Argyleshire, Aberdeenshire, Perthshire, Morayshire, Roxburghshire and Mid-Lothian. There is the Arthur Seat jasper, found on Arthur's Seat; the Pentland pebble on the Pentland Hills; the Perth bloodstone on the Ochil and Moncrieff Hills; the Montrose grey pebble at Montrose, and so on. A small rivulet in the land of Burns contributes one of the richest and finest specimens that is to be found in Scotland. The Arthur Seat jasper deserves special notice, being rich in color and variegated in streaks. It is found in large quantities on the face of the hill. On the top of the Cairngorm ranges, in Aberdeenshire, the cairngorm stones or crystals are found in great abundance. Not many years ago the Scotch amethyst could be plentifully procured and cheaply purchased, but now it is becoming scarce, and brings in the market from 50s. to 60s. per ounce. Another favorite Scotch crystal is the garnet. It has a red, or port wine color, and is found in very small quantities, of no great size, at Elie Point and along the sands on the coast of Fife. A jewel in which the yellow cairngorm, the lilac amethyst, and the pink or red garnet is harmoniously combined, is remarkably fine. Our moss agate is not the least beautiful and valuable of gems, and for certain styles of setting it is peculiarly suitable. But the chief of our Scottish gems is the pearl. There was a tiara finely set in gold and enamel in the Dublin Exhibition, valued at £500, made of Scotch pearl. Fine specimens of pearls are found in the rivers Forth, Teviot, Clyde, Earn, Tay, Tweed, and the rivers of Ross and Sutherlandshires. A fine specimen not larger than a pea will bring £25, and larges ones will command at times as much as £80 or £90.—*London Mining Journal.*

South American Coal Mines.

Coal exists at various localities along the Pacific coast, from Russian America to Patagonia, and is now mined to a limited extent in Vancouver's Island, Washington Territory, Oregon, California, at Panama, in New Granada, and at the towns of Lota, Lotilla, and Coronel, in Chili. But all these coals are of later date than the true Carboniferous, and appear to be the production of periods from the Jurassic to the Tertiary. They are of all grades of the bituminous class, from the mineral pitch, or asphaltum, to the natural coke. The veins or seams are generally thin and unreliable, and subject to the imperfections natural to all coals of recent formations. But, under present circumstances, these deposits of coal are invaluable to the commerce of the Pacific.

The coal mines of Panama are worked by several English and American companies, almost exclusively for the use of the ocean steamers of the Pacific. The coal is of a soft, bituminous character, and is much inferior to the English and our Cumberland steam coals.

Though coal exists at intervals along the entire Pacific coast, it is only worked at two prominent points south of California, viz., Panama and at the Chilian mines in the northern portion of Araucania. The mines in Chili are located at the towns or bays of Lota, Lotilla, and Coronel, which lie about 200 miles north of Valdivia. The coal area is comparatively extensive, but the seams are generally thin and frequently terminate abruptly. Their dip is irregular or undulating, and mining operations are conducted by both shaft and drift. A considerable coal trade is done here, and sailing vessels are constantly being laden for various ports on the Pacific, and passing steamers generally supply themselves here. The coal is soft, and burns rapidly with great flame and smoke, but leaves only a moderate residuum, and makes no clinker.

Electrical Countries.

In a paper addressed to the Academy of Sciences, M. J. Fournet treats of a new and curious subject, viz., the electric state of certain regions. From the report of this paper, in "Galignani," it appears that in the mountains of the basin of the Rhone and their offshoots, there are some spots distinguished for their evolution of electricity, which is sometimes very remarkable; while others, though apparently identical in surface, are in a state of absolute electric neutrality. Some very striking instances of this are quoted by M. Fournet. On the night of August 11, 1854, when Mr. Blackwell was on the Grands-Mulets, at an altitude of 3,455 meters, the guide, F. Couttet, on leaving the hut, perceived the surrounding ridges apparently on fire. He immediately called to his companion to witness the scene, which was owing to a tempest. Their clothes were literally covered with electric sparks, and their fingers, when held up, were phosphorescent. At that very time Lyons was visited with a deluge of rain, and the whole day had been exceedingly stormy. In 1841, as the same guide was accompanying M. Chenal up Mont Blanc, they were overtaken by a violent storm, and found themselves enveloped, as it were, in thunder and lightning. All the stones and rocks around them emitted electric flames, and yet the summit of Mont Blanc, and the sky around it, was perfectly clear. In 1867, Saussure, Jalabert, and Pictet, were on the Breven at an altitude of 2,520 meters. They soon experienced a strange pricking sensation at their fingers' ends on stretching them out. This sensation became stronger and stronger, and at length electric sparks could be drawn from Jalabert's hat-band, which was of gold lace, and even from the knob of his cane. As the storm was raging above their heads, they had to descend some twenty-five or thirty meters, where the influence of this electricity was no longer felt. Another instance of this occurred on July 10, 1863, when Mr. Weston and several other tourists ascended the Jungfrau, and there the snow itself, which fell during the storm which overtook them, proved to be electric.

We see by a cable despatch that Brown & Level's life-saving tackle, for instantaneously lowering and detaching small boats from the sides of vessels going at full speed, has been adopted by the French navy, after a trial at Toulon. We are pleased to hear of Messrs. Brown & Level's success in introducing their most excellent invention abroad. Patents upon it were secured through this office in the United States, England, and in several countries on the continent.

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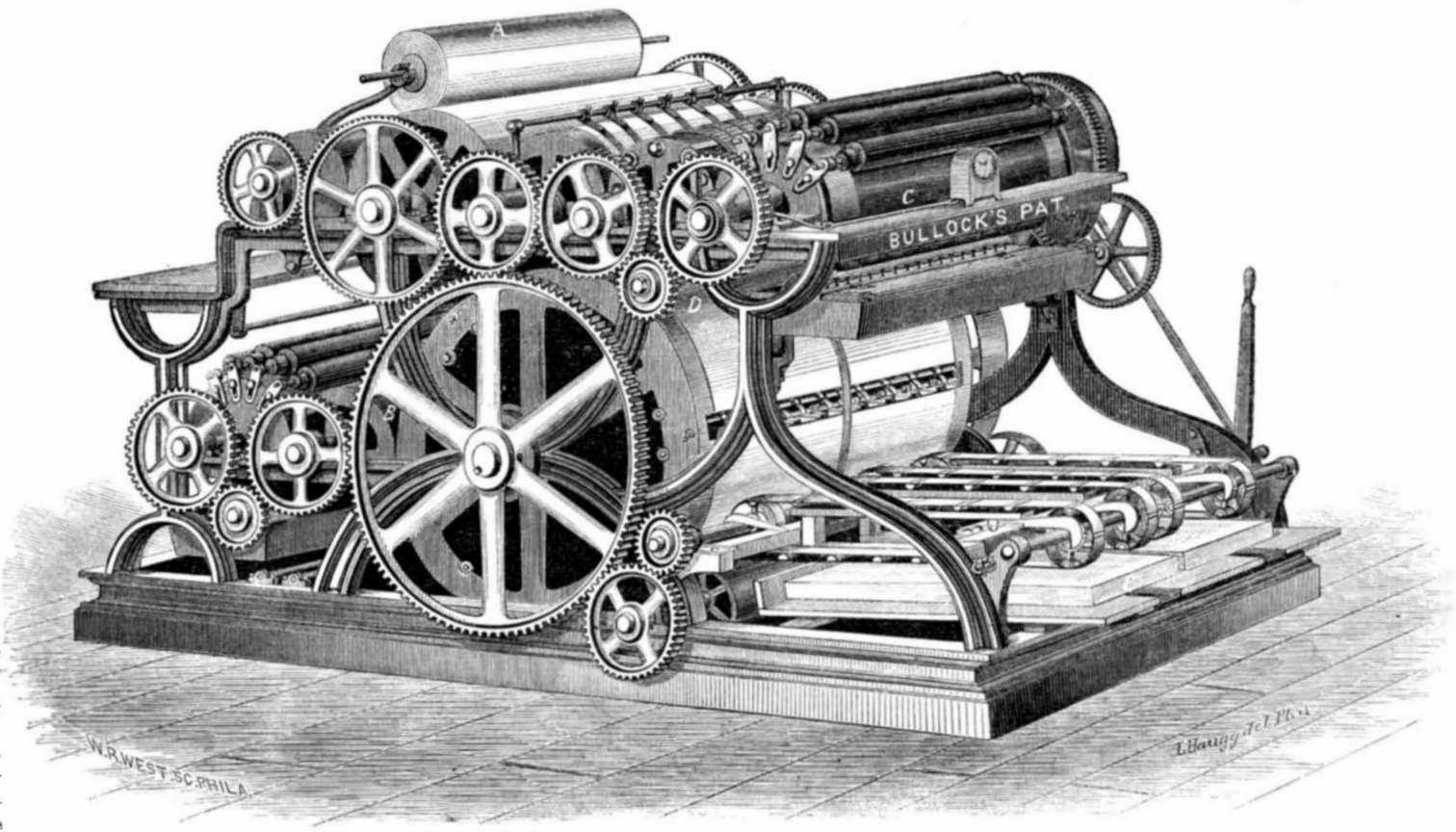
Bullock's Printing Machinery.

The largest proportion of all the letter-press printing now done, is executed upon what are known as "cylinder" printing machines—a discovery which dates back to 1790, due, we believe, to William Nicholson, of England, who, about that period, took out a patent. His plan consisted in attaching the types to a cylinder, and the impression was produced by making the types press against the sheet, which was carried on another cylinder. This is the general principle upon which all of the fastest newspaper presses now operate. A modified form of cylinder press, in which the types are placed on a flat bed, while the sheet is carried on a cylinder, is very extensively employed for book and job printing.

In nearly all of the above forms of cylinder presses the paper is only printed upon one side, and is fed to the machine by hand one sheet at a time. The operation is thus partly mechanical and partly manual After the edition has been all passed through and printed upon one side, the types are changed and the second side is printed. For every printing cylinder an attendant or "feeder," as he is termed, is required. If the press has one cylinder, then one "feeder" works; if two cylinders, then two feeders.

On page 136, current volume, the reader will find an illustration of the great ten-cylinder printing presses now in use at the *New York Herald* office. It is the practice at the *Herald, Tribune, Times,* and other prominent daily newspaper offices, to run two or more of these great printing presses, and to transfer the sheets from one press, as fast as one side is printed, to the other press, thus quickly completing the press-work on both sides. To run two of these presses requires the employment of twenty men as "feeders." Their wages are about $3 a day each, so that the cost of merely placing the sheets on the press forms a great item of newspaper expense.

Many attempts have been made to get rid of this expense by rendering the cylinder presses automatic in their operation, but without much success until the rare genius of the late William Bullock, of Pennsylvania, developed new light upon the subject. In carrying out his plans he made practical use of the important and valuable patents of Mr. M. S. Beach, the present proprietor of the *New York Sun.* We have the pleasure to present herewith several illustrations of Mr. Bullock's inventions.



BULLOCK'S SELF-FEEDING AND PERFECTING PRESS.

In his Self-feeding and Perfecting Machine the paper is supplied to the press in the form of a large roll, A, containing enough to make several thousands of newpapers. B are the type cylinders, on which the usual stereotype plates are secured; C are the inking cylinders; D the blanket cylinders, between which and the type cylinders the sheets are pressed and printed.

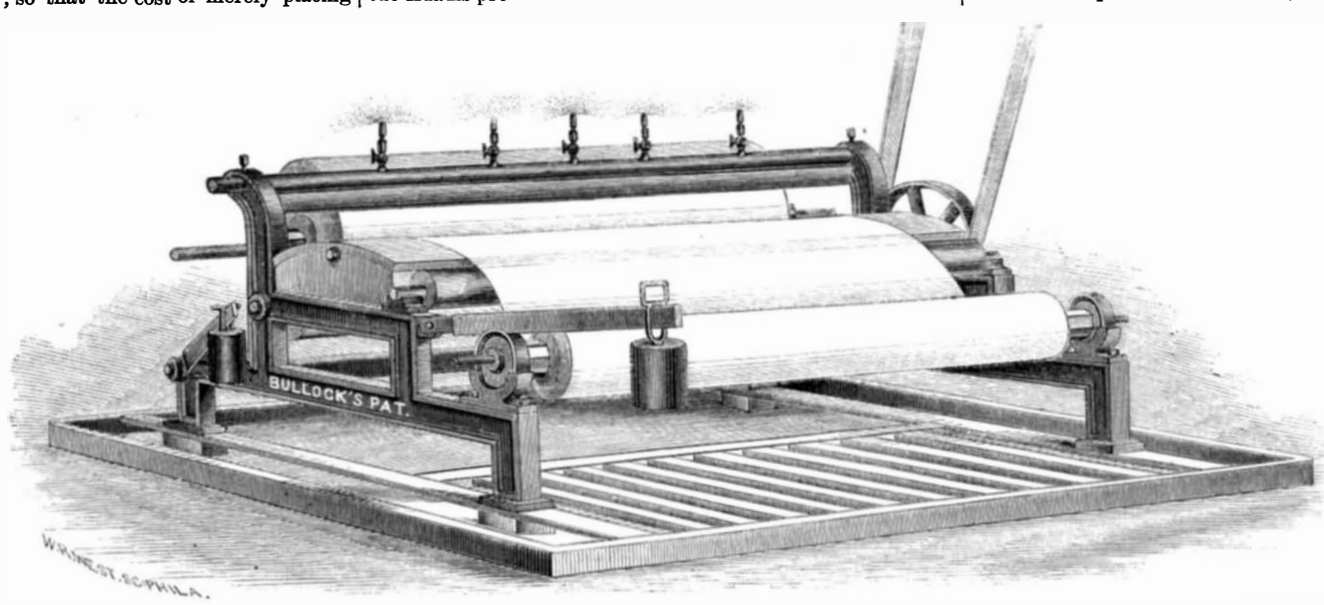
The operation is very simple. The roll of paper, A, having been mounted in its place, the machinery is started, unwinds the paper, cuts off the required size, prints it on both sides at one operation, counts the number of sheets and deposits them on the delivery board, E, at the rate of 8,000 to 14,000 per hour, or counting both sides, at the rate of 16,000 to 28,000 impressions, The labor is only that of placing the rolls on the press and removing the printed paper, which ordinary hands can do.

We have seen some most excellent book printing done on the Bullock machines which are at work in the government offices in Washington. They are also employed in some of the prominent newspaper offices in Philadelphia and New York. At the *Sun* office, in this city, the Bullock presses have been in use for a long time in turning out the immense daily edition of that paper. Two more presses—the same kind but of an enlarged and superior pattern—are now being introduced there.

The Bullock press promises to effect a considerable revolution in the art of printing. It is adapted to all kinds of press-work, fine or rapid. Its capacity for the rapid production of printed sheets is unequalled. Its first cost is comparatively small. But a small place or room is necessary for setting it up. The largest size is eleven feet long, six feet wide, and six feet high. Only two hands, common laborers, exclusive of pressmen, are required for its management. Being simple in construction it is not liable to get out of order and can be easily repaired.

We have seen an official report, by O. H. Reed, superintendent of the press room in the government printing office at Washington, made to John D. Defrees, Congressional Printer, in which he shows that it would require eighteen of the Adams presses to do the same amount of book-work now being executed on a single Bullock press; and that the use of this press effects a net economy of $375 a week over such Adams presses. The Bullock press prints 200,000 octavo pages in a single hour. It runs with great steadiness and uniformity, and the number of spoiled impressions average only about one-tenth of one per cent. The estimated average of spoiled sheets on the common fast newspaper presses is between one and two per cent. The ordinary presses require of the paper manufacturer that before delivery he shall cut his goods into sheets, count, wrap and tie them up in separate bundles. All this consumes much wrapping paper, twine and time, which is saved by the use of the Bullock press, as the paper is delivered in rolls just as it naturally issues from the paper-making machine, and the paper-maker is enabled to supply paper for these improved presses at from one to two cents a pound cheaper than ordinary paper. The Bullock press prints with a perfect register, and for newspaper work this is important as it permits the reduction of the blank margin of the sheet, and thus saves paper.

Altogether the advantages and economies in favor of these new machines are so great that, in many cases, printers might, by adopting them, be enabled to throw away their present cumbersome presses as old iron, and make a very large annual profit by the operation. Think of saving $5,000 on the press-work of a single job. This is the statement from the government office in reference to the printing of the volume of the Agricultural Report which was printed on a Bullock press.



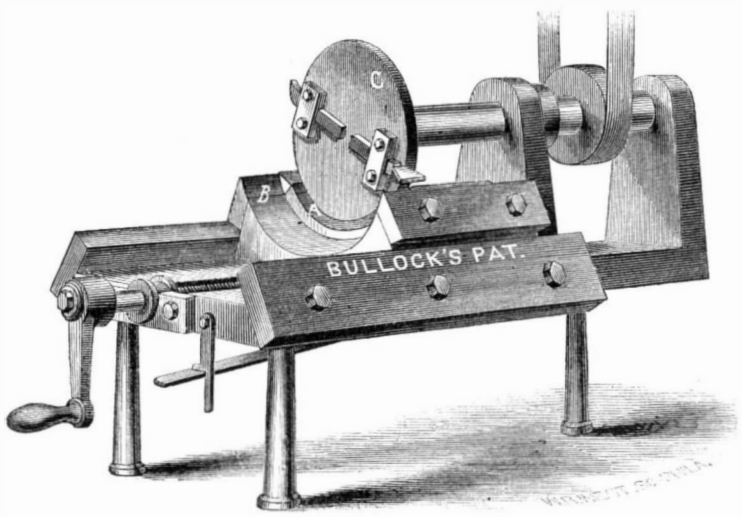
BULLOCK'S PAPER WETTING MACHINE.

In connection with the printing machine Mr. Bullock invented a very simple and excellent device for wetting the roll of paper, which we also illustrate. It will be readily understood by a glance at the engraving. The paper is passed from one roller to another, and midway in its passage a number of jet fountains are so arranged that their spray will fall upon the passing sheet.

Another very ingenious improvement is the machine for shaving the backs of the curved stereotyped plates. The plate, A, rests in the concave movable bed, B, which travels under the cutter head, C. The latter rotates with great rapidity, and reduces the back of the entire plate to a perfect parallel with the type face in the short space of two minutes.

Full information concerning these valuable inventions can be obtained by addressing the Bullock Printing Press Company, 738 Sansom street, Philadelphia.

The Company manufacture several modified forms of presses, for printing both sides, suitable for small editions of books and newspapers.



BULLOCK'S STEREOTYPE PLATE SHAVING MACHINE.

In France milk is packed in small tins, easily moved by one man, and by a simple contrivance the stopper screws close down upon the contents of each tin, so that the motion of the railway cannot churn the milk *in transitu.* The tins are then placed in covered wagons, and in summer are wrapped in cloths, which are watered from time to time, so as to promote coolness by evaporation. The result of this care, which costs but little, is that the milk supply of Paris is proverbially excellent. Why do not some of our New York milk dealers adopt this plan?

THE MILLIONTH PART OF AN INCH.—Mr. Whitworth has been striving to give to a committee from the House of Lords a just conception of this extremely minute subdivision of a linear space. He uses this illustration: "You have only to rub a piece of soft steel a few times to diminish its thickness a millionth of an inch.

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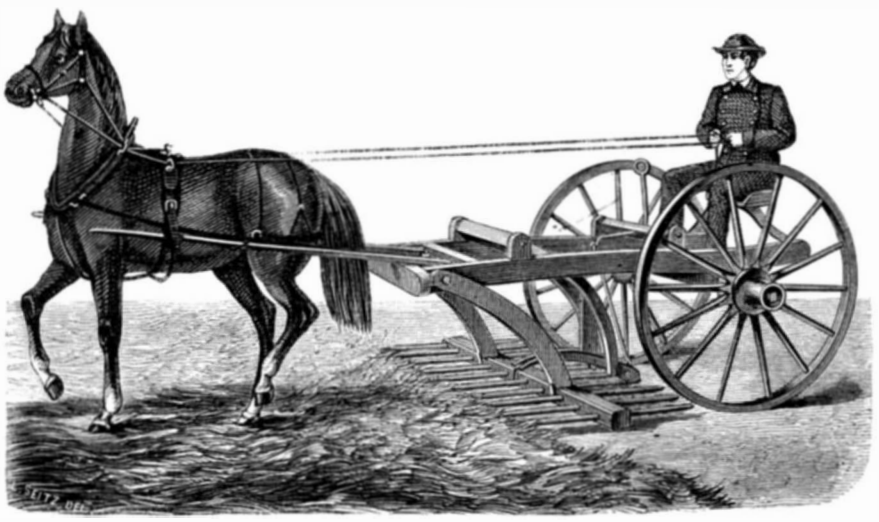
Self-Adjustable Single-Horse Hay Rake.

One of the principal obstacles to the general adoption of the horse hay rake in some portions of the country, where the land lies in alternate hill and dale or hole and knoll, is the continual care and anxiety on the part of the driver to avoid the sudden inequalities of the ground and still gather his hay in a workmanlike manner. It is enough to do to keep the horse or horses in train without being compelled to attend also to every obstacle in the form of irregularities on the surface of the ground.

The engraving presents a perspective view of a single horse hay rake, the teeth of which are allowed to adapt themselves automatically to the surface of the ground without the direct intervention of the driver. The rake head is suspended by braces projecting downward from the front of the curved side bars, the connections being made with straps passing from the braces around bearings on the rake head. The teeth are held in position by similar curved arms which reach to the rear side of the teeth and are held by notches on the teeth. A pawl engages with two projections on the rake head, which is pivoted to the rear curved arms and is operated by a handle directly in front of the driver's seat. When the rake is loaded the driver merely pulls this handle toward him, which disengages the pawl, when the rake revolves and discharges the load, the pawl at once reëngaging with the rake head and holding it in position for gathering another load, the teeth of the rake, by the peculiarity of its suspension, allowing sufficient movement for ready adaptation to the unevenness of surface and still keeping close to the ground.



JOHNSON'S IMPROVED HAY RAKE.

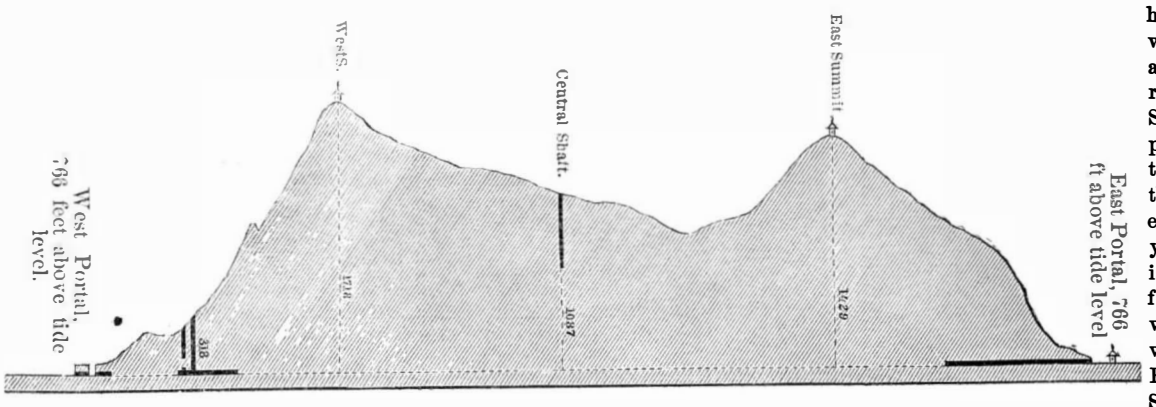
The rake cannot be thrown out of gear or revolved by this slight movement until the driver releases it from contact with the pawl, which is entirely under his control. No more definite description is probably necessary for a proper understanding of the peculiarities and advantages of the implement.

It is the subject already of several Fair premiums, although the letters patent—secured through the Scientific American Patent Agency—are dated only July 2d, 1867. Rights are for sale by the inventor, Sylvester Johnson, box 238, Evansville, Ind.

The Great American Tunnel through the Hoosac Mountain.

We reproduce a profile view of the Hoosac mountain and tunnel, from the official report of the Joint Standing Committee of the Massachusetts Legislature on the Troy and Greenfield Railroad, because great general interest has been felt in its progress, which the terrible accident of Oct. 19th has revived and stimulated.

The charter of the road known as the "Troy and Greenfield Railroad" was granted in 1848, and it authorized the construction of a railroad from a point on the "Vermont and Massachusetts Railroad," at or near Greenfield, Mass., to the line of the States of New York or Vermont, to connect with any railroad which might be constructed from or near Troy, N. Y. Its capital stock was limited to $3,500,000. The great work to be done was to construct a tunnel under the Hoosac mountain, a distance of nearly five miles, of which, on the first of January last, 5,873 feet had been bored.



THE HOOSAC TUNNEL.

The progress of the work has been greatly retarded by the inability of contractors to perform their engagements, owing partially to the errors made in calculating for the work—such calculations being more or less, from the nature of the undertaking, conjectural—and from financial difficulties. On the first of January, 1867, the excavations at the east end had reached the extent of 569 feet, at the rate of about 47.42 feet per month. But little has been done at the west end. The tunnel here must, from the nature of the strata, be sided and arched with brick, for the manufacture of which extensive brick yards have been established in close proximity. 24,000 bricks are molded daily by six brick machines.

The dimensions of the tunnel are as follows: Rock cutting, 24 feet high and 24 feet wide; the brick work, 26 feet high and 26 feet wide; the bottom of the tunnel having a culvert three feet deep, the tunnel being graded toward either end to facilitate the escape and discharge of water. In the culvert is laid a 12-inch pipe for the conveyance of air for ventilating purposes; an 8-inch pipe to carry air for the drilling machines, and a 3-inch pipe for supplying water to the holes which are being drilled. If gas is to be used for lighting purposes, it will be conveyed in a similar manner.

At the east end are two air compressors, designed to drive the drills, each having four cylinders, those of one being 13 inches diameter by 20 inches stroke, and those of the other 25 inches diameter by 24 inches stroke. They are driven by water from a canal fed by the Deerfield river, a dam across which, being a part of the work, cost $244,912.29. The central shaft is intended to afford additional means of prosecuting the work of tunneling, and also to ventilate the tunnel when completed. It is of oval form, or its cross section is an ellipse whose axes are 27 and 15 feet respectively. When completed, its depth will be 1,037 feet. More than half that distance was completed when the terrible accident occurred which sent thirteen poor fellows into eternity. As the machinery for pumping the water from the shaft was destroyed by the fire it is rapidly filling up, and work is, of course, suspended here for a time.

The west shaft has an area of 8 by 13 feet, and is 316 feet deep. The power used here is an engine of 100, and one of 40 horse power, driving a compressor of four cylinders 13 inches diameter and 24 inches stroke. On the 1st of December last the heading toward the east was advanced 1,042 feet, and that toward the west, 293 feet.

Water greatly impedes the operation of the workmen, much of the power used being employed to free the tunnel and shafts. On one occasion, at the west shaft, the workmen struck a stream which discharged at the rate of 23 gallons per minute. The pumps were unable to prevent its rise, and larger ones had to be procured. After it was pumped out, on recommencing work, another vein was struck that discharged over 100 gallons per minute. Subsequently, and after extra exertions, the water was removed sufficiently to allow the work to proceed.

The new shaft is located about 264 feet westerly of the west shaft. It is 6 by 13 feet in diameter, and will be, when completed, 277 feet deep. It is worked from both above and below. On the first of January last, those working from the top had reached a depth of 180 feet, and those from below had progressed 45 feet. At this point are two engines, one of 14 and one of 10 horse power.

After making a succession of experiments with different drilling machines, the one known as the Burleigh drill has been finally adopted. We can give no intelligible description of it without diagrams. Much, however, of the work is done by hand drilling. For blasting, Dr. Ehrhardt's powder was tried in November, 1866, but its effect was not satisfactory, a poisonous gas being evolved which drove the miners from their work. The cost of this powder is about twice that of common powder but its power for blasting purposes is superior.

Last summer, Col. Tal. P. Shaffner experimented with nitroglycerin, an account of which we gave, from the pen of Col. Shaffner, at the time. The committee from whose report we quote speak highly of its effects, and recommend it as possessing palpable advantages. The blasting is done, however, with ordinary blasting powder, these attempts to supersede its use being evidently regarded merely as experiments. The blasts are fired entirely by electricity.

From the foregoing it will be seen that this great work is "making haste slowly." A glance at the diagram, which is drawn to a scale of little over 4,000 feet to the inch horizontal, and about 1,100 vertical, will show that with the methods hitherto employed it is almost hopeless to look for the completion of this work during the present generation. Meantime, however, some more rapid method of boring and mining may be introduced which may make what seems at present a task of almost infinite labor, one comparatively easy of successful accomplishment. We sincerely hope such may be the case.

Ancient Roman Draining Wheel.

The Paris *Presse* relates the discovery, in one of the mines of Portugal, of an old wheel which was doubtless employed by the Romans to raise water in the operation of draining the mine. It is well known that the hydraulic works of the Romans surpassed in extent any of those of modern times. As that great people had not the use of either steel or gunpowder, they were sometimes obliged to raise water over a ledge, where modern engineers would carry it right through. In some of the mines of San Domingo were dug draining galleries nearly three miles in length, but in some places the water was raised by wheels to carry it over the rocks that crossed the drift. Eight of these wheels have recently been discovered by the miners, who are now working the same old mines. These wheels are made of wood, the arms and felleys of pine, and the axle and its supports of oak, the fabric being remarkable for the lightness of its construction. It is supposed that these wheels cannot be less than one thousand and four hundred years old, and the wood is in a perfect state of preservation, owing to its immersion in water charged with the salts of copper and iron. From their position and construction these wheels are presumed to have been worked as treadmills by men standing with naked feet upon one side. The water was raised by one wheel into a basin, from which it was elevated another stage by the second wheel, and so on for eight stages. The wheel is on exhibition at the Academy of Arts

The Siemens Process.

Although the new mode of steel manufacture recently patented by Mr. C. W. Siemens has not as yet obtained a commercial standing or importance, it is attracting considerable attention on the part of metallurgists in this country and abroad. The Siemens process consists in reducing the iron from its ores by the action of gases containing a surplus of carbon, and elevated to a high temperature by the combustion of a part of these gases. It is, in fact, the action of a reductive flame, such as used very frequently in metallurgic operations on a large scale, or such as can be produced on a small scale by means of the blowpipe. This flame deprives the metal of the oxygen and other elements combined with it in the ore, and brings it down in a molten state, as cast iron if charged sufficiently with carbon and tapped at a low temperature, or as steel if the proportion of carbon be smaller, and the temperature of the furnace sufficiently high for keeping this steel in a liquid state. The process in its abstract and theoretical *rationale* is one of great scientific beauty. It attempts to treat with the materials in the most direct manner, avoiding all the different makeshifts and imperfections which are included in the present practice of iron smelting. In its practical development, the Siemens process has not as yet passed its infancy. Experiments have been made by Mr. Siemens in his model steel works at Birmingham apparently on a very small scale, and a small piece of steel made by his process is exhibited at Paris. The Barrow Steel Works have commenced experimenting on a much larger scale, a furnace which, according to present notions, may be considered a full-size specimen for practical work, having been erected in these steel works, and some charges of hematite ore having been smelted or reduced into steel in this furnace. Some ingots are said to have been produced, but the facts relating to the manner of working, and the lessons drawn from these first experiments, cannot be published yet. The furnace, we understand, is now about to be altered, and further experiments will be made with it shortly. At the recent visit of the guests of the Furness Railway Company to the Barrow Steel Works, this new furnace, although not in operation, and so far under reconstruction that very little of its internal arrangement remained visible, seemed to be regarded as an object of great interest by several visitors.

The question naturally arises, what are the practical advantages to be expected from this new process? but this cannot be answered otherwise than in very general terms at this early date. It is likely that the production of steel by the Siemens process will require less carbon than the present mode of first over-carburizing the iron, and then decarburizing it by a special and second process. It is also clear that the application of gaseous fuel will make the quality of iron much less dependent upon the quality of the fuel, since the very worst kinds of fuel can be made suitable for smelting by generating gases, and purifying the latter before they come in contact with the ore. The formation of a suitable slag in the process of smelting will, in an equal degree, lose its importance, since the iron in the Siemens furnace does not require a similar protection against any oxidizing influence, as is the case in the blast furnace in front of the tweers. The only condition which seems to come out more prominently and more forcibly in the Siemens process than in the present practice of iron smelting and steel making is purity of the ore. This, however, seems to become more and more a primary condition with iron smelting in its present form, and will not, by itself, interfere with the prospects of success of the new process, if all the other necessary conditions will be fulfilled in a sufficiently practical manner.—*Engineering*.

AN ACCURATE AIM.—After some experiments with the old musket in 1838, the committee of officers drew up a table of "instructions for soldiers" in firing with it. Among other things the soldiers are told, "in firing at a man at 600 yards, always aim 180 *feet above him*." A note in *The Engineer* is our authority.

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Steel Under the Microscope.

An experienced steel maker can estimate very closely the precise quality, chemical composition, tensile and compressive strength, and even the mode of treatment which a steel has undergone, by looking at its fracture. The appear ance of the crystalline texture which is more or less discernable by the naked eye, and the method in which the reflected light gives certain variations of luster, are the scanty yet very important indications from which, by a series of guesses as to probabilities, an opinion may be formed which has every chance of being correct. This being the case, it seems very obvious that, by the assistance of the microscope, we should be capable of observing the texture of steel and iron fractures more correctly and more minutely, and a smaller amount of experience or nicety of observation should be sufficient—should enable us to form a correct opinion of the qualities of any given sample of steel. This is the case, and to such an extent that it is most astonishing how metallurgists could have neglected the use of the microscope to such an extent as it generally has been. We have already drawn attention in this journal to the interesting researches made by M. Schott, the manager of Count Stöllberg's foundery at Ilsenburg, upon the appearance of liquid and solidifying cast iron under the microscope, and we can quote the experience of this metallurgist as to the advantages to be obtained from microscopic observation of various kinds of steel. M. Schott, at his visit to the Paris Exhibition, made some most remarkable "guesses," as some steel-makers would call his conclusions, with regard to the qualities and method of manufacture of many hundreds of steel samples exhibited there, and of which he, in many cases, had no other knowledge than that which he could gather through the aid of a small pocket microscope, made of two pieces of rock crystal, formed into a very powerful single lens. A pocket microscope of this kind ought to be the companion of every man interested in steel manufacture. Lenses of the usual kind, even if piled up in sets of three or four, are entirely insufficient. The lens must be of a very small focus, and properly achromatic. A little practice is sufficient to enable the user to "see" through this lens; but it is, of course, not quite so easy to learn the meaning of what is thus seen, and to estimate from the appearance the quality of the steel inspected.

M. Schott has established for himself a kind of theory which, we believe, will be useful to those of our readers who desire to use the microscope in their researches upon the qualities of steel. M. Schott contends that each crystal of iron is an octahedron, or rather, a double pyramid raised upon a flat square base. The hights of the pyramids in proportion to their bases are not the same in different kinds of steel, and the pyramids become flatter and flatter as the proportion of carbon decreases. Consequently, in cast iron and in the crudest kinds of hard steel, the crystals approach more to the cubical form from which the octahedron proper is derived, and the opposite extreme, or the shaft wrought iron, has its pyramids flattened down to parallel surfaces or leaves, which, in the arrangement, produce what we call the fiber of the iron. Between these limits, all variations of hights of pyramids can be observed in the different kinds of steel in which these crystals are arranged more or less regularly and uniformly, according to the quality and mode of manufacture. The highest quality of steel has all its crystals in parallel positions, each crystal filling the interspaces formed by the angular sides of its neighbors. The crystals stand with their axes in the direction of the pressure or percussive force exerted upon them in working, and consequently the fracture shows the side or sharp corners of all the parallel crystals. In reality good steel under the microscope shows large groups of fine crystals like the points of needles, all arranged in the same direction, and parallel to each other. If held against the light in a particular direction, each point reflects the light completely, and a series of parallel brilliant streaks are shown all over the surface. Now, the exact parallelism of the pointed ends or of the streaks of light is one of the most decisive tests for a good quality of steel, and this is not visible quite so frequently as might be generally imagined. On the contrary, a great majority of steel fractures show crystals arranged in parallel groups or bundles, as before described, but clustered together in several distinct crystalline layers, which are not parallel to each other. The consequence is that the needle-points, visible under the microscope, appear to cross each other at certain places, or at least they point in such directions that, if elongated, these lines would cross each other at a short distance in front of the fractured surface. Wherever the crossing actually takes place, a ridge or line is generally visible to the naked eye, and the color of the two parts of the fractured surface which contain the different groups is different, since the light which falls upon one group at the proper angle for reflection will be in such a position with regard to the other group as to throw the points of the crystals into the shade. The one part of the surface, therefore, will appear bright or silvery white, while the other will look dark or grey in color. As usual, inferior specimens are more instructive than the best qualities, because there the peculiarities and faults come out most strikingly. We have seen a piece of a Bessemer steel block from a spoiled charge, in which the crystalline structure of the spiegeleisen was seen in some spaces, particularly at the edges of the air-bubbles, perfectly distinguished from the coarse-grained crystals of the mass of steel all round. This mass, moreover, contained groups of very different character within itself. In a specimen of steel or iron, made by another process, we could discover clearly defined crystals of pyrites, indicating the existence of sulphur in an unexpectedly tangible manner. Repeated melting, heating, or hammering of steel has, in general, the effect of reducing the sizes of crystals, and also of laying them more parallel. Still there seems to be a difference between the treatment which gives parallelism and that which causes the reduction of sizes in the crystals. The former seems to be principally due to the action of the heat, and repeated melting is the great panacea in this respect. The small-sized crystals, or what is called fine-grain, can be obtained by mere mechanical operations. In fact, hammering at a dull, red heat, or even quite cold, is known to produce the effect of making the grain of steel extremely fine. This is a property, however, which is lost by reheating, and at a sufficiently elevated temperature, steel seems to crystallize in large grains, which remain if it is allowed to cool slowly and undisturbed by mechanical action.—*Engineering.*

Ice in Deep Mines.

The main entrance to the pits at Dannemora, Persberg, one of the oldest and most celebrated of the Swedish iron mines, is a natural opening or abyss, of so large a circumference as to require some fifteen minutes to walk around its mouth. A scaffold is erected out so as to overhang this abyss, upon which the hoisting machinery is placed. The observer can look down into this frightful abyss upward of 500 feet, to which point the light of day extends, and beyond which all is shrouded in darkness, save when feebly illuminated by the dim lights of the miners. One of the most remarkable facts connected with this mine is the large quantity of ice which is always present there. Professor Von Leonhard, in his "Popular Lectures on Geology," says: "The deeper you go the more the ice increases. And in order to remove it from the pits it must be raised up in buckets. At some places the ice is 90 feet thick; it forms real glaciers, which are never diminished by any change of external temperature. This fact, however, should not be regarded as contradictory to another, which will hereafter be illustrated, and which is that pits become warmer in proportion to their depth. The phenomenon at Persberg, as we shall see, can be explained on natural principles. When the visitor has reached the bottom he is conducted by his guide into vaulted chambers, through immense regions of ice. Many of these vaults are so large that fifty men can conveniently work in them at the same time." This occurrence of ice in deep mines is not an isolated fact. Ice is found in the pits of Ehrenfriedensdorf, in Saxony. Leopold Von Buch tells us that formerly, in Norway, mining was prosecuted above the region of eternal snow. Wood, for the timbering, could not be had there, and its want was supplied by filling up a drift with water, and allowing it to freeze; passages were then cut through the ice as they were needed, the balance of the ice being left in lieu of wood for timbers. It is also well known, says the *Mining and Scientific Press*, that the ancient Peruvians obtained ores on the Cordilleras, in places elevated above the perpetual snow line. The mines of Rauris, in upper Austria, lie entirely within the glacier region, and most of the shafts open in eternal ice, clear as crystal; the miners' huts are surrounded with ice. On what is known as Gold Mountain one of the shafts is sunk 100 feet through pure glacier ice. A gold mine in the deep valley of the Alps, near Salzberg, is the highest in Europe which is now worked. There are two tunnels near this mine entirely surrounded with glacier ice. The miners of this region undergo great hardships from exposures, and to avalanches, which often sweep them to destruction while going to and fro to their work, or while reposing in their cabins on the hill sides. It is stated by one authority that there is a locality deep within one of the iron mines of Dannemora, already noted, where the mass of ice is 120 yards thick.—*Mechanics' Magazine.*

NEW PUBLICATIONS.

WHEELER'S HOMES FOR THE PEOPLE. Geo. E. Woodward, 191 Broadway, N. Y. Price $3.

This is one of a series of new works on architecture, just from the press of Mr. Woodward, who makes it a specialty to publish this class of literature. Gervase Wheeler, author of the work under consideration, had his manuscript ready for the press some years ago, but unfortunately the building where the work was in preparation was consumed by fire and the work of many weary months was lost. But what was his loss was the public gain, for there have been many improvements in architecture since the author's calamity, which he has introduced into the volume before us. The work is embellished with one hundred engravings of villas, cottages, and country houses of every order of architecture, with plans and estimates of cost.

WHEELER'S RURAL HOMES.

The author of "Homes for the People" has also published through Woodward, 191 Broadway, a similar but less comprehensive work entitled "Rural Homes," in which he not only illustrates plans of a number of cheap cottages, but also gives engravings of a variety of rustic furniture suitable for summer houses and lawns, such as settees, chairs, flower stands, etc. The author also gives hints as to the best mode of plumbing and heating country houses; also a form for drawing a specification and contract between the landlord and builder. Price $2.

WOODWARD'S RURAL ART. Geo. E. Woodward, Author and Publisher, 191 Broadway, N. Y. Price $1.50.

The volume before us is No. 2 of Mr. Woodward's annual, on the subject of architecture and rural art. It is not unlike Wheeler's works, noticed above, in its general character. Mr. Woodward designs to issue a work of this kind every year, adding all the new features and fashions in the construction and finish of country houses, Either of the above works will be found useful to builders or persons about to erect or furnish country houses.

HASWELL'S ENGINEERS' AND MECHANICS' POCKET BOOK. New York: Harper Brothers.

Mr. Haswell has long been known as one of our most experienced and reliable civil engineers. His Pocket Book is regarded as one of the standard works, for ready reference, in all that relates to engineering. For some time past the author has been engaged in enlarging and revising the matter contained in previous editions, and the result is now before the public. From about 300 pages he has enlarged the book to 650 closely printed pages, and we venture to say that no work of the kind has ever been produced which contained so much information upon the various branches of engineering, condensed into so small a space. The principal tables, rules, estimates, calculations, etc., employed in the mechanic arts, architecture, railroading, civil engineering, steam navigation, are given in the most convenient and intelligible form. Mr. Haswell's new book ought to be in the possession of every engineer and mechanic in the country.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Philadelphia claims to be the greatest manufacturing city in the world, except London. In 1866 the factories there produced over two hundred million of dollars worth of staple goods.

Turkey has projected three lines of railway, the first from Constantinople to Belgrade; the second from Enos, a short distance west of Constantinople, to Varna on the Black Sea; the third from Enos to Usknip in Northern Macedonia. The contract for them has been awarded, and the means will be furnished by English, French, and Belgium capitalists.

The gold yield for the country for the present year is about as follows: Montana $12,000,000; Idaho $6,000,000; Oregon $2,000.000; Colorado $5,000,000 Nevada $19,000,000; California $25,000,000, and miscellaneous $5,000,000. Total $74,000,000.

The common 60-seat American railway passenger car costs from $4,000 to $5,000 each, while the English style of railway coach introduced on a few of our roads cost about $14,000. There is a wide difference too, in the weight, in favor of the American car. The interest on the greater cost, and the hauling of the extra weight of the English car must be paid for by those who value exclusiveness sufficiently to use them. In cases where the English coach have been introduced here, they have not proved a profitable investment, and there is very little prospect of their being widely adopted.

The coal deposits of Russian America are pronounced valueless, the mineral being found only in small contorted seams. Iron is found in worthless beds of clay, and far up on the Konkon, gold may be obtained but under such circumstances that it is also valueless, being only workable two months in the year. Stains of copper have been found on rocks near Norton Bay, but no ledge or seam.

There is a stone quarried in Cornwall, Eng., called the Polyphant stone, which can be cut by a hand saw with ease when first mined, but in time becomes exceedingly hard. It occurs of a neutral grey color, and also of a green with red spots and is admired by architects for its chromatic effects.

The New York and New Haven railroad have just introduced a new system of warming their passenger cars, by means of hot water circulating through pipes placed under each seat. By following this plan all the heat is economized and thus keeping the feet of the passengers warm, the whole body experiences an agreeable sense of comfort. We hope to see other roads adopting this excellent mode of warming cars.

A train of thirty cars was loaded with railroad iron at the Cambria iron works, Johnstown, Pa., last week, the destination of which is a point on the Pacific Railroad over five hundred miles west of Omaha, Nebraska. The distance to be traversed is fifteen hundred miles, considerably more than half way "across the continent," and all this distance is to be traversed without transhipment of the iron.

The number of Bessemer steel converters now established in Europe, numbers 115, which are capable of producing half a million of tuns per annum. England with fifty-two converters turns out weekly 6,000 tuns. Prussia with twenty-two converters is the next greatest producer, 1,460 tuns weekly. Next comes France with twelve converters and 880 tuns; Austria, fourteen converters, and 650 tuns; Sweden fifteen converters, and 530 tuns. The Bessemer process is worked at one locality only in Belgium, and Italy has two establishments, with a very small yield.

South America does not propose to be outdone on the trans-continental question by its northern compeer. A project is on foot to extend the Valparaiso and Santiago railroad across the Andes to Buenos Ayres. A German engineer, Otto Von Armen, has surveyed the route, a company has been formed, the government has been applied to for a charter and grant of land on both sides of the track upon which they propose to establish German colonies, although liberal inducements will be held out to all other nationalities to settle there. As an instance showing how railroading pays in South America, it is stated that the road from Santiago to Valparaiso has earned during the past year the sum of $910,241, being quite an increase over the previous year.

The experimental elevated railroad in Greenwich street this city has been completed for quarter of a mile from the Battery. At the last meeting of the stockholders the engineer's exhibit of present and probable future cost, having been inspected it was unanimously resolved to proceed with the extension of the road one quarter mile further, to Cortlandt street, preparatory to its inspection by the State commissioners, as required by law.

The Massachusetts State Council, recently by a unanimous vote, annulled the contract made in July with Messrs, Dull, Gowan and White, for completing certain portions of the Hoosac tunnel, including the central shaft. They authorized the commissioners to take possession of all the tools etc., belonging to the State and to make an immediate settlement with the contractors. The reasons for this are that the bids for the contract were much too low and an increase of rates would soon be necessary, and the council are adverse to making any advance in that direction.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

MANUFACTURING BRICKS.—E. W. Crittenden, Pittsburgh, Pa.—This invention relates to certain new and useful improvements in manufacturing bricks, designed for operating on a large scale, and more especially with a view of dispensing with the hard labor and expensive manipulations hitherto required in the process of brick making. The invention consists, 1st, in an improved means for crushing or pulverizing the clay, and bringing it to a proper elastic state to be molded or compressed into bricks. 2d, in an improved means for molding and compressing the clay into bricks, and 3d, in a novel and improved means for drying the compressed clay, or unburnt bricks to render them suitable for burning in the kiln.

SAFETY ATTACHMENT FOR WATCH POCKETS.—Edward Williams, New York city.—The present invention relates to an attachment to watch pockets of wearing apparel, the object of which is to prevent the abstraction or removal of the watch carried in such pocket from the same, without the knowledge or consent of the wearer or owner, thereby obviating all possibility of the watch being stolen when the person wearing it is in a crowd, or otherwise favorably situated for the operations of thieves, pickpockets, etc.; the said safety attachment being of such a nature and construction as to be easily manipulated by the wearer, and to offer no impediment to the free removal of the watch by such person.

MACHINE FOR HEADING AND SQUARING BOLTS.—Albert R. Bailey, New Haven, Conn., and Wilson W. Knowles, Plantsville, Conn.—This invention relates to a new and improved machine for heading and squaring bolts, and it consists in a novel arrangement of dies and a header, arranged to operate in such a manner that a square is formed on a bolt, contiguous to its head, of greater thickness than the body or main portion of the bolt, and the head and square formed on the bolt at one operation.

CORN PLANTER.—J. M. Sampson, Waynesville, Ill.—This invention relates to a new and improved corn planter, of that class in which the seed distributing device is operated by hand, the device being mounted on wheels, and all so arranged that a very simple, cheap and efficient corn planter is obtained.

BRUSH HOLDER.—Joseph Messinger, Springfield, Vt.—This invention relates to a new and improved holder, by which scrub-bushes may be firmly secured to a handle to admit of the brush being used without the necessity of the operator stooping over and working on the knees, as is now universally done. The invention consists in constructing the holder in such a manner that the handle thereof may be turned or adjusted in a position at right angles with the brush, or longitudinally therewith, and the holder at the same time be perfectly simple in construction, and economical to manufacture.

GATE SPRING.—W. W. Sutliff, Town Line, Pa.—This invention relates to an improvement in a spring for a gate or door, and consists of a flat, covered, metal spring, hinged at one end to the back of a gate, while the other end is free to catch in one of a series of notches in a block fastened to the post or frame of a gate or door, which spring, by its pressure, keeps the gate closed when it is not forcibly pushed open.

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THILL COUPLING.—Silas Rogers, Stanfordville, N. Y.—This invention relates to a new and improved mode of connecting thills to axles, whereby the thills may be readily attached to and detached from the axle, and all rattling of the parts avoided.

DEVICE FOR CUTTING BOOT AND SHOE HEELS.—Benj. F. Goddard, Charlestown, Mass.—This invention relates to a new and improved machine for cutting boot and shoe heels, and is designed to save labor and stock in the production of that work. The invention consists of a combination of dies or cutters, of different sizes, arranged in such a manner that they may be manipulated or adjusted so that the several layers of leather composing a heel may be cut out to form a heel approximating to the desired shape, requiring but a trifling amount of trimming in order to finish it.

TOWELS.—John Cash, Coventry, England.—This invention relates to an improved method of manufacturing towels to be employed for friction of the surface of the skin of persons after bathing, or similar purposes.

HAND LOOM.—T. Henry Tibbles, Kansas City, Mo.—This invention relates to improvements in an ordinary hand loom, and consists in a new device for operating the drivers and throwing the shuttle by the motion of the lay, with one picker staff and a shifting weight, and working the treadles by direct action of the lay, without treadles, through the medium of cam rollers.

HAND LOOM.—A. Smith and P. P. Smith, Plymouth, Mo.—This invention relates to improvements in the construction and arrangement of a hand loom, and consists in a device connected with the shuttle drivers in such a manner that the motion of the lay shall operate on the drivers to throw the shuttle, and also a device connecting the treadle shaft with the lay to work the treadle.

SNOW PLOW.—James S. Zane, Pleasant Plains, Ill.—This invention relates to an improvement in the construction of snow plows for railroads, and consists in inclined planes which are mounted on a truck and rise from the bed of the road to an elevated double mold board, which is hinged and so arranged in combination with machinery that it may be raised and lowered as required.

WINDOW JACK.—S. P. Loomis, Philadelphia, Pa.—This invention relates to an improvement in the construction and arrangement of a window jack or platform support for house painters.

BURGLAR ALARM.—D. B. Skelly, Lockport, N. Y.—This invention consists in an arrangement of springs which, when set or strained, are held in position by a small wire or thread, but when the wire or thread is broken or loosened the springs are liberated, which liberation or recoil gives the alarm by ringing a bell and discharging a pistol, and at the same time it ignits a match and lights a lamp.

CENTER BOARD.—Felix Doming, Penataquit, N. Y.—This invention has for its object to improve the construction of center boards, and make them more effective in operation.

DRILLING MACHINE.—George Downing, Schuylerville, N. Y.—This invention has for its object to furnish an improved drilling machine, simple in construction, easy to be operated, which can be so adjusted that the full force of the blow may be effective, whether drilling a shallow or deep hole, and which will drill vertical or inclined holes with equal facility.

BROADCAST SEEDING MACHINE.—Augustus Weitman, West Union, Iowa.—This invention relates to a new and improved broadcast seeding machine, and it consists in means employed to prevent the choking of the harness and also in means to insure a proper distribution of the seed and the sowing of the same in a perfect manner.

PADDLE WHEEL.—E. F. Bostrom, Newnan, Ga.—This invention relates to a new and improved paddle wheel designed for both river and sea steamers and has for its object a more efficient action than hitherto of the buckets or float boards against the water and the perfect operation of the buckets or float boards at varying depths of immersion.

HAIR PICKING MACHINE.—Franklin Frey, Liberty, Ill.—This invention relates to a new and useful improvement in the construction of a machine for picking or breaking up the matted knots of hair used for mixing with mortar to plaster houses.

AIR CHAMBER.—Richard H. Hilton, Newbern, N. C.—This invention relates to a new and improved method of constructing air chambers for pumps and other purposes where it is desired that a steady and uniform current of liquid or fluid should be discharged and the invention consists in arranging a strainer and ball valve in the chamber and also a sand trap or sediment chamber therein.

COMBINED HORSE BLOCK AND HITCHING POST.—George W. Preston, Corning, N. Y.—This invention which relates to a combined horse block and hitching post consists essentially in combining in one device made of cast iron or other suitable material a horseblock and hitching post.

COMBINED SHRINKING AND PUNCHING MACHINE.—C. V. Statler, Woodhull, Ill.—This invention relates to a new and improved method of shrinking and punching wagon tires and other articles.

FORMING AMD CUTTING WIRE.—J. Wasson, Elyria, Ohio.—This invention consists in the arrangement of a hollow circular guide and in feeding rollers which are driven by gearing and in a cutting knife which may be operated by the foot whereby wire for tinners' use and for other purposes may be formed, measured off, and cut with great celerity.

CHAIR BOTTOM.—C. W. Royse, Peterborough, N. H.—This invention relates to an improvement in chair bottoms and consists in securing the overlapping ends of the network to the frame by means of wire staples.

DEVICE FOR BENDING TIRES.—Dennis Wetzel, Springfield, Mo.—This invention relates to an improved device for bending tires for wheels. It consists of a double-rimmed wheel to suit tires of different sizes.

MANUFACTURE OF WHITE LEAD.—Isaac M. Gattman. New York city.—The nature of this invention consists in manufacturing white lead by a new and improved process whereby the metal is wholly converted without waste, into white lead of great purity of color and perfect opacity in a very short time compared with the ordinary and most approved process by corrosion of the metallic lead known as the Dutch method.

BULLET MACHINE.—W. Spillman, Marion Station, Miss.—This invention relates to improved devices for forming bullets or minie balls and consists in revolving disks or rollers having one or more eccentric grooves cut in the face of their peripheries in combination with cams and impinging rollers or stationary dies so constructed and arranged as to compress and shape cylindrical sections of lead fed into the machine as to form spherical or conical balls as described.

COAL SCREEN.—Edward W. Weston, Providence, Pa.—This invention relates to an improvement in the construction of screens for separating broken anthracite coal and assorting it in different sizes, and other similar purposes.

DISTILLING SPIRITS OF TURPENTINE.—David Cashwell, Fayetteville, N. C.—This invention relates to an improvement in distilling spirits of turpentine and consists in an apparatus for applying steam to extract and expel the spirits of turpentine and rosin from crude turpentine and pine wood.

HAND LOOM.—H. M. Cooper, Lindley, Mo.—This invention relates to improvements in the construction of hand looms and consists in an arrangement of mechanism in connection with the lay or batten by the motion of which back and forth all the operations of the loom are performed, the whole structure being simple, easily regulated and kept in order, while the working of the loom is positive and effective in every part for weaving fine or coarse cloth.

WINDOW FASTENING.—Benson Mayo, Chatham, Mass.—This invention relates to an improved fastening for window blinds and consists in a device which catches and holds the blinds either open or closed alike.

DOOR AND GATE SPRING.—Enos Stimson, Montpelier, Vt.—This invention relates to a door and gate spring for holding a door or gate either open or closed, as desired.

TOILET TABLE OR STAND.—F. Kopper, New York city.—The present invention relates to improvements in a toilet table or stand, which consists in so constructing the stand that it can be folded up into a compact shape when not in use, and when to be used brought to the proper form to receive and support a foot bath or a wash bowl, or any other toilet article, or to be used for any of the ordinary purposes of the toilet.

TRY SQUARE.—J. E. Cowdery, Wheatland, Iowa.—This invention relates to an improvement in try squares, and consists in a blade held to a cross piece by a pivot and furnished with a finger pointing to a graduated scale.

IRONING TABLE.—Albert A. Chittenden, Boston, Mass.—This invention relates to an improved ironing table, and consists of a table or skirt board supported at one end upon a rail secured to the wall and setting under a bracket.

WOOD TYPE CABINET OR CASE.—Charles Aldrich, Marshalltown, Iowa.—By the present invention a cabinet or case for wood type is provided, which in its construction is simple, and in its operation convenient and most practicable, and one in which the type can be kept entirely free of dust or dirt.

TRACE BUCKLE.—A. E. Bailey and H. Nichols, Middleville, N. Y.—The buckle embraced in the present invention is extremely simple in its construction and arrangement, and in use most efficient and practicable.

HOOK FOR HOLDBACK STRAPS.—Wm. A. Bagley, Ansonia, Conn.—The holdback hook embraced in the present invention is constructed in two parts or sections, one of which is fixed to the shaft and the other arranged to swing therein, so as to open or close the same, it being made with a spring so as to fasten itself to the fixed part when brought over the same.

SNOW HORSESHOE.—Ervine Carman, Schoolcraft, Mich.—This invention relates to an improvement in snow horseshoes, and consists of a spring placed beneath the hoof with a rubber between it and the hoof.

SHOW STAND.—John G. Oonk, Owensville, Ohio.—The present invention relates to an improved stand for the storing and showing of goods, etc., in stores, which consists in providing the stand or closet with a series of rollers on which the goods are wound and from which they can be unwound for being shown, etc.

HOSE GUARD.—David P. Lewis, Huntsville, Ala.—The present invention relates to a guard for the hose of fire engines when laid across a street having railroad tracks, in cases of fires, the object of which is to allow the running of the cars and at the same time afford no obstruction to the free passage of the water through the hose.

CHIMNEY.—Jos. F. Stafford, North Granville, N. Y.—The object of this invention is to prevent buildings being set on fire from burning out of the chimney. The invention consists in the employment of a damper located in the chimney near the top, and operated by means of a lever attached thereto, which is readily operated by a mere child.

STEP LADDER.—M. E. Abbott, Bethlehem, Pa.—This invention relates to a new and improved method of constructing step ladders, whereby they are rendered adjustable and so formed that the braces may be folded up in a small space.

BOW INSTRUMENTS.—George Gemünder, New York city.—This invention relates to a new manner of arranging the sound posts in violins, violincellos, base violins, tenor violins, or other bow instruments, so that a greater equality of sounds may be produced, and so that the tones may be propagated with more clearness, power, and distinctness than they could on instruments in which the ordinary sound posts are used.

ROTARY SWING.—J. N. Forrester, Bridgeport, Conn.—This invention relates to a new rotary swing, which is so arranged that the seats revolve both around a horizontal and a vertical axle; whereby a very ageeable motion is obtained, and whereby all sense of giddiness, generally created by the simple revolution around a horizontal axis is completely overcome or avoided.

HEAD BLOCK FOR SAW MILLS.—Charles H. Brookbank, Connersville, Ind.—This invention consists in the construction and arrangement of the parts by which the screw-shafts on which the head blocks slide, are operated, so that they are only revolved in one drection while the log is to be fed, the same being headed by a vertical lever, the lower end of which is pivoted to the carriage while its upper portion is connected with a horizontal sliding bar.

PUMP FOR COMPRESSING AIR.—Onofrio Abruzzo.—Harlem, N. Y.—This invention relates to a new arrangement for compressing air, in such a manner that the air can be compressed to an indefinite degree by hand or by any small power.

WASHING MACHINE.—W. W. Cox, Carbondale, Ill.—This invention consists in the manner of hanging one of the rollers around which the apron passes, said roller being arranged nearly under the corrugated roller, and is hung in dovetail blocks, which slide in corresponding grooves that are provided in the sideboards of the suds box.

CAR STARTER AND BRAKE.—John Wiley, 2d, South Reading Mass.—This invention has for its object to improve the construction of the improved car starter and brake patented by the same inventor, March 12, 1867, and numbered 62,911.

STEAM BRAKE.—Eugene Bourson, Brussels, Belgium.—This invention relates to a new apparatus for using the steam from the boilers without loss, in order to regulate the motion of the piston, and the speed of trains on deep grades, and to slacken or stop the progress of a train without resorting to the ordinary brakes. The invention consists in conducting steam directly from the boiler to both ends of the cylinders, so as to form a steam cushion on each side of the piston.

CORSET.—A. W. Webster. Ansonia, Conn.—The present invention relates more particularly to the clasps for corsets, and it consists in making the hook portion or part of such clasps of wire, bent into the proper shape therefor, whereby rivets are dispensed with, and a stronger and more reliable, as well as cheaper clasp, produced.

BRANDING IRON.—Charles Rundquist, Mankato, Minn.—The present invention consists, among other features, in a novel construction of the holder for the types, also in the form of the shanks of the types, and in the means employed for securing them in the holder.

MEAT SPIT.—Paul Fisher, Williamsburgh, N. Y.—This invention has for its object to furnish an improved spit so constructed and arranged as to be more convenient and satisfactory in use than when constructed in the ordinary manner.

CHIMNEY.—Bennett J. Goodsell, Pent Water, Mich.—This invention has for its object to furnish an improved chimney so constructed and arranged as to ventilate the room or rooms of the house, act as a spark arrester, and at the same time prevent the wind from blowing or driving the smoke down the chimney.

RUBBER SHOE.—J. Weidenman, Hartford, Conn.—This invention has for its object to furnish an improved device for attachment to rubber overshoes, to keep them from slipping down upon or working under the heel of the inner shoe.

PLOW.—Jonathan R. Davis, McKay, Ohio.—This invention has for its object to furnish an improved plow so constructed and arranged as to adapt itself to uneven ground, and so as to enable it to work close up to the upper row of plants, upon side hills, and which may be readily adjusted for use as a rigid plow or as a single plow.

MILL GEARING.—Joshua C. Cunningham, Oglethorpe, Ga.—This invention relates to the combination and arrangement of the stationary base wheel, the gear or pinion wheels, and the arms upon which they revolve, and the crown wheel, with each other, and with the main or driving shaft.

COTTON AND HAY PRESS.—Barnabas B. Alfred, La Grange, Ga.—In this invention a double-acting screw operates in combination with two slotted levers, working the follow-block with great power and velocity.

CONSTRUCTION OF STOVES OR OTHER HEATING APPARATUS FOR WARMING AND VENTILATING BUILDINGS.—Thomas Whitaker, and Joseph Constantine, Manchester, England.—The object of this invention is to obtain an heating apparatus for air or liquids, which, though comparatively occupying but a small space, presents not only a very large surface to the medium which is to be heated, but exposes also a large surface to the fire and the hot gases, which are compelled to come into contact with all the available heating surface in such a manner that nearly all the heat obtained from the combustion of the fuel is given off to the apparatus, and produces useful effect, instead of escaping for the most part through the chimney, as is usually the case.

MANUFACTURE OF TRUNKS, VALISES, ETC.—Samuel S. Ritter, Philadelphia, Pa.—The object of this invention is to manufacture a substantial leather trunk, which shall have no seams at the edges, and which may be made entirely without stitching, for the purpose of economy, strength, and durability.

SEWING MACHINE.—Caleb Cadwell, Waukegan, Ill.—This invention is designed to effect improvements in the mechanism for feeding and guiding the cloth, regulating the tension, taking up the slack thread, and winding the thread upon the spools; and in the method of retaining the spools upon their axes, and operating the shuttle.

COOLING GLASS MOLDS.—J. H. Reighard, Wheeling, West. Va.—In this invention the plunger is made hollow, and connected with a hollow piston rod, and is cooled by water injected through the piston rod. The mold is formed of two parts, between which is a narrow apace. Into this space water is injected from a reservoir, when the instrument is in use, for the purpose of cooling it.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

G. H. S., of Mich.—A good way to learn to draw sketches of machinery is to copy the engravings published in the SCIENTIFIC AMERICAN. Begin with the simplest ones.

S. W. P., asks, "Can you supply me with a recipe for making a paste that will be water-proof?" No. We wish we could. Here is a chance for inventors.

E. H., of Ohio., asks if it is necessary to extend his exhaust pipe far up the smoke stack to aid his draft. We think it only necessary to introduce the exhaust pipe into the up-take and turn the end upward to produce the desired result.

J. H. G., of Ky., inquires as to the proportions of sand and hydraulic lime to make a cement to harden under water for a foundation on gravel. We can only refer him to Gillmore's "Treatise on Hydraulic Cements" published by D. Van Nostrand, 192 Broadway, New York city, as the qualities of the cements sold in the market, and the sands found in different localities vary greatly.

J. B. P., of Vt., says he has used one of "Douglas' pitcher spout pumps No. 1, the barrel being two-and-a-half inches and length of stroke four-and-a-half inches. The leading pipe is fifty-six feet in length, the hight of the pump from the water in the well twenty-five feet perpendicular. It will not work; neither will a larger size, which I tried. What is the difficulty. Will a smaller pump or larger pipe do the business?" Knowing that the Douglas pump is a good one, we can only surmise that there must have been some trouble in the connections, or that the pump, itself, needed some doctoring. Certainly any properly constructed pump the connections of which are perfect ought to lift water twenty-five feet.

B. G. K., of Md., asks for the components of the well-known Babbitt metal. Although there are superior compositions in the market, yet many of our readers may desire information on this subject. To four pounds of pure copper melted, twelve pounds of best tin (Banca is considered as pure as any) are gradually added; then eight pounds of antimony (regulus). After melting, twelve pounds more of tin are added. Powdered charcoal sprinkled over the surface of the metal in the crucible will prevent oxidation. When to be used for lining boxes one pound is sometimes melted with two pounds of tin.

A. A. W., of N. Y.—"Which is the strongest, a solid cast-iron shaft, or one with a small hole or of a larger size through the center from end to end, and would the same answer to this question be applicable to a shaft of wrought iron or steel?" In casting iron, or even steel, the outside cools and contracts more rapidly than the interior; consequently a hollow shaft of equal or the same weight is stronger than a solid shaft. Forged shafts of wrought iron and steel are not sublect to the same law in the same degree.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Pattern Letters and Figures for inventors, etc., to put on patterns for castings, are made by Knight Brothers, Seneca Falls, N. Y.

Wanted—A second-hand low-pressure engine of about sixty horse-power. Address A. Catchpole, Geneva, N. Y.

The attention of those engaged in the manufacture of Burglar-Proof Safe Locks is called to an advertisement on our last page.

A Great Bargain.—The Patent Right of Forman's Combined Steam Baker and Reflecting Roaster, illustrated on page 312, present volume Scientific American, will be sold low, either entire or by States and Counties. Address Israel Forman, Fairmont, West Va.

Parties wishing to purchase good second-hand Portable and Stationary Engines, from four to fifteen horse-power, apply to Abram Logan, Tideoute, Pa.

Patent Office Reports.—Persons desiring Patent Office Reports can be supplied at low prices. Address Samuel C. Jones, Box 773, New York Postoffice.

Hand Machines or Planes for cutting out Match Splints, wanted. Send cuts and prices to Packard's Machinery Agency, Milwaukee, Wis.

S. G. Tufts, Maineville, Ohio, wishes the address of all parties engaged in making Hames and Plowhandles.

M. Nial, Troy, N. Y., wants address of Toy makers.

Manufacturers of improved machinery for manufacture of Cotton Batting, address; with description, T. L. Kinsey, Savannah, Ga.

Wanted—a second hand set of Tinners' tools. Address, with full description and price list, H. D. Heath, Candor, Tioga county, N. Y.

I wish to know where I can obtain Peat put up for shipment. Peat charcoal would suit me better. C. Browning, Rush Run, Jefferson county, Ohio.

E. Ware, Bayonne, N. J., wishes the address of Threshing Machine Manufacturers, especially at the West.

Fish Nets.—Manufacturers of machinery for making these articles will please address J. F. Brown, Lock Box 20, Binghamton, N. Y.

Parties desiring any kind of new apparatus invented, or drawings, etc., made, address with confidence, A. E. W., Inventor and Draftsman, 114 Fulton st., New York.

Geo. S. Hurford & Co., Canton, Ohio., wish to obtain a machine that will make small bolts with a head on both ends, in size from 1 inch long by 3-16 inch thick, up to 8 inches long by ½ inch thick.

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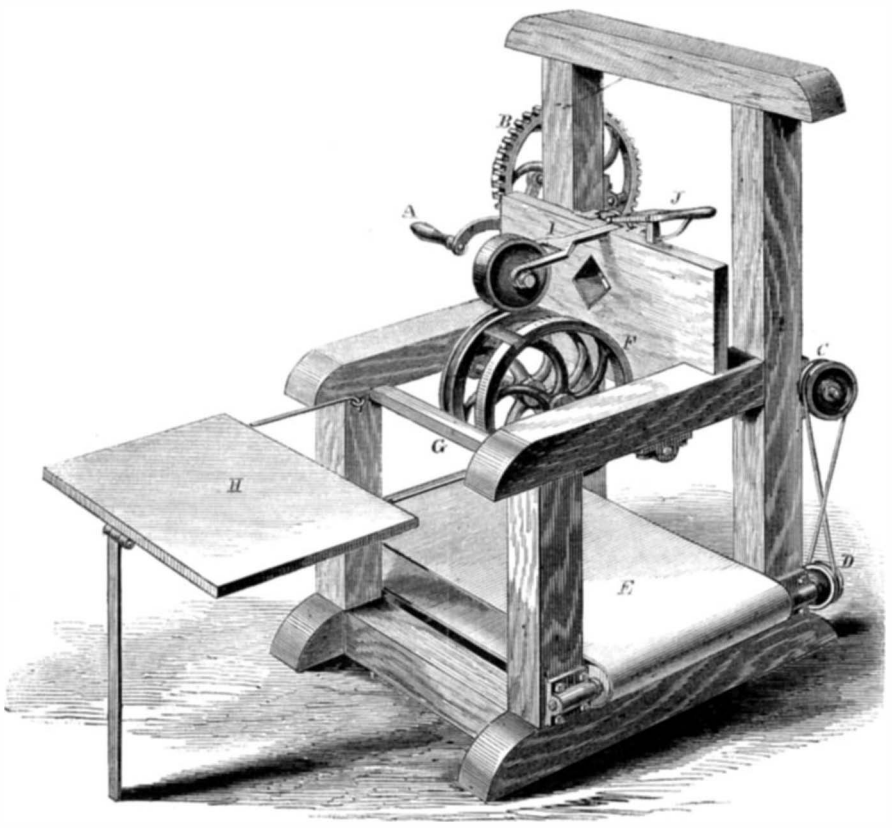
Machine for Topping and Stripping Sorghum and Sugar Cane.

Every additional facility for the extraction of the saccharine matter from cane or other sugar-yielding plants is of general importance, as the use of sugar is now almost universal and the demand for it constantly increasing. Sorghum, as well as sugar cane, must be stripped of its leaves before going to the crushing mill, and this work, if performed by hand labor, is slow and quite laborious. The engraving presents a view of a machine which performs this work rapidly and effectually.

The machinery is mounted on a suitable frame and is simple and easily managed. The power is applied, either by hand, through the crank, A, or by power, to the gear wheel, B, which drives the pulley, C, connecting by a belt with D, to give motion to the endless apron, E. The same shaft on which is the pulley, C, drives the shaft seen in the front part of the machine. On this shaft is a cutter wheel, F, and a grooved wheel for receiving the stalks and presenting them to the stripping knives. The topping wheel, F, has one or more knives seated in its periphery which in their swift revolution pass in immediate contiguity with a fixed curved blade on the bar, G. This device is for topping the cane, the tops falling on the apron, E, which carries them out of the machine and deposits them on one side.

The cane is laid on the table, H, between which and the frame the operator stands. After topping the cane each stalk is passed between the peripheries of the grooved wheel and the smaller one above it, which is held in connection with the former by the spring arm, I; the lower or grooved wheel being faced with rubber to insure the necessary adhesion and the upper one being either grooved or plain, this, however, being immaterial. In an upright, back of these feed wheels, is a V-shaped knife fixed, with which engages a similar one that may be elevated or depressed by the lever, J, the knife working in upright slides. This lever may be operated with a spring with sufficient tension to hold the two V-shaped knives close to the stalk. The leaves fall upon the endless apron and are carried, like the toppings, off to the side of the machine. The edges of the V-shaped knives are so beveled as to offer no opportunity of becoming clogged. The machine may be extended to any required length, as the machinery is very light and easily driven, requiring but little power.

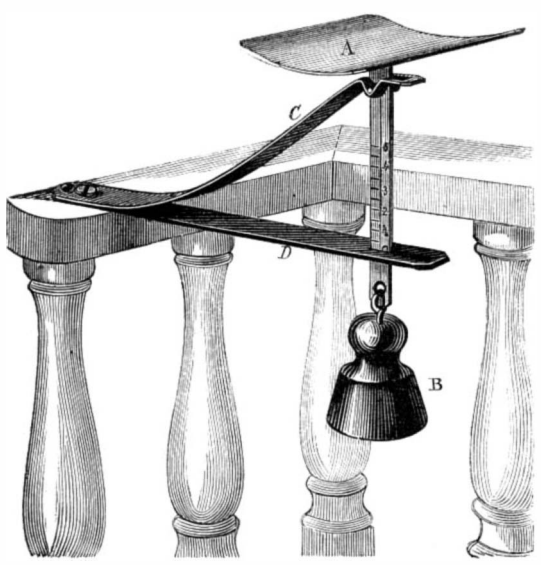


CAMPBELL'S IMPROVED CANE STRIPPER.

This machine was patented through the Scientific American Patent Agency, May 21, 1867, by James A. Campbell, who may be addressed for the purchase of State rights or the entire patent at Kent, Portage county, Ohio.

SCALE FOR WEIGHING LETTERS, PAPERS, ETC.

The engraving presents a view of a scale intended for determining the weight and therefore the postage of mailable matter, as letters, papers, pamphlets, etc. Something similar



is needed, not only in mercantile concerns and offices where the correspondence is voluminous, but also in private families, as it saves annoyance and trouble to the writers of letters, as well as to post office clerks. The device shown is intended to furnish a very cheap apparatus, which can be used at all times and under all circumstances. It can be easily described.

The scale, or receiver, A, has attached to its bottom a slip of metal graduated to ounces and their parts, and held steadily in position by a weight, B. At the upper end of this slip is a spring, C, which engages with knife edges on the upright slip, and is riveted at its other end to a support, D, through the outer end of which is a longitudinal slot allowing for the vibrating or swinging movement of the upright, which passes through it. The arrangement may be permanently secured to a desk, or railing, as seen in the engraving, or may be temporarily held when the letter is placed on the scale, A. The spring, C, is made of tempered steel, or of hard rolled brass, tested to its tension so as always to give the same results. The whole concern in itself weighs but a few ounces, and cannot, on account of its simplicity, get out of order. Patented through the Agency of the Scientific American, October 15, 1867. Agents are wanted in every city and town. Communications may be addressed to Cox & Latham, 299 State street, New Haven, Conn.

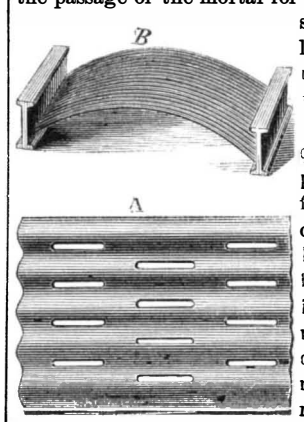
Luxurious Chair.

One of the most simple and useful improvements in household furniture that has recently come to our knowledge, is a new chair, a substitute for the rocking-chair, patented by D Witt, of Hubbardstown, Mass., on the 20th of last August, and made and sold by Dexter Howe, 169 Canal street, New York. The frame of the chair-seat rests upon two upright iron bearings, firmly screwed to the frame, the lower end resting in a socket which allows the upper portion of the chair to rock back and forth. Near the center of the bottom of the chair two coil springs are so arranged that they perform the office of rockers in an ordinary rocking chair, the bearings supporting the weight of the occupant, and admitting only the back and forward movement, which the springs assist the sitter in making. This chair possesses all the good features of a rocking chair, and is free from the objectionable features of an ordinary rocker.

ROYS' APPLICATION OF CORRUGATED IRON.

The enormous increase of strength, or resistance to strain and pressure, gained by corrugating thin iron, otherwise too weak for the purpose intended, is well known to mechanics generally; but the varied uses which iron thus treated may be made to subserve may not be so well understood. In the construction of buildings and boats it has for many years been employed, and also for roofing purposes. The engraving, however, represents its application for laths to support mortar or plaster, as well as its use for arched connections between flooring beams.

For the former purpose the ordinary thin sheet iron is employed, having holes punched through it at intervals, to allow the passage of the mortar for "clinching," as seen at A. The



sections may be made of any length or width required, and may be held to the ceiling or walls by nails or screws. For he latter, where strength is required, thicker iron may be employed in combination with iron flooring beams, as seen at B. It can be used for clapboarding, lining, siding, or roofing, as may be required, rendering the building absolutely fire proof, and immensely stronger than any brick or wooden structure. These do not exhaust the uses of this method of preparing iron, as the intelligent reader may easily see.

For these applications of corrugated iron a patent is now pending through the Scientific American Patent Agency. Communications may be addressed to F. Roys, Hoyt & Co., East Berlin, Conn., for further information.

Artificial Production of Ice.

It is not necessary for the production of ice that the temperature of the air should fall to the freezing point. Ice may be produced abundantly in all latitudes where the thermometer falls to 40° F., if proper appliances are employed; and as this temperature is reached at some period of the winter days in nearly all of our Southern States, there is no reason why the inhabitants should not provide themselves with ice houses and store up their supplies, just as we do here at the North. Large quantities of ice are made in the night time, in India, in the months of December, January, and part of February, the thermometer standing at from 35 to 40. The following description of the method employed near Benares, and equally applicable to this country, we find in the *Repertory of Arts*:—

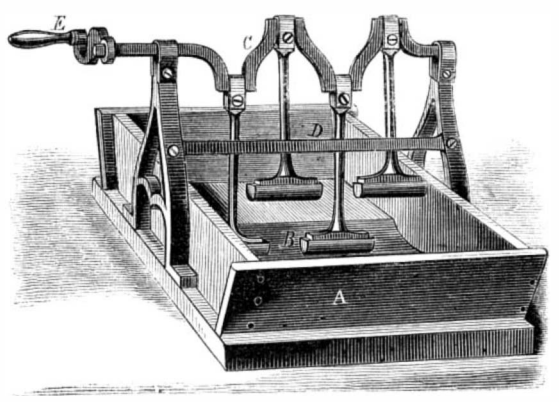
"A space of ground of about four acres, nearly level, is divided into square plats, from four to five feet wide. The borders are raised, by earth taken from the surface of the plats, to about four inches; the cavities are filled up with dry straw, or sugar-cane haum, laid smooth, on which are placed as many broad, shallow pans, of unglazed earth. as the spaces will hold. These pans are so extremely porous that their outsides become moist the instant water is put in them: they are smeared with butter on the inside, to prevent the ice from adhering to them; and this it is necessary to repeat every three or four days; it would otherwise be impossible to remove the ice, without either breaking the vessel, or spending more time in effecting it than could be afforded, where so much is to be done in so short a time. In the afternoon, these pans are all filled with water, by persons who walk along the borders or ridges. About five in the morning they begin to remove the ice from the pans, which is done by striking an iron hook into the center of it, and by that means breaking it into several pieces. If the pans have been many days without smearing, and it happens that the whole of the water is frozen, it is almost impossible to extract the ice without breaking the pan. The number of pans exposed at one time is computed at about 100,000; and there are employed in filling them with water in the evenings, and taking out the ice in the mornings, about 300 men, women, and children: the water is taken from a well, contiguous to the spot. New vessels, being most porous, answer best.

"It is necessary that the straw be dry; when it becomes wet, as it frequently does by accident, it is removed and replaced. I have wetted the straw of some of the plats, and always found it prevented the formation of ice. The air is generally very still when much ice is formed; a gentle air usually prevails from the south westward about daylight. I had a thermometer among the ice pans, during the season of making ice, with its bulb placed on the straw, and another hung on a pole, five feet and a half above the ground; and commonly observed that when ice was formed, and the thermometer on the straw was from 37 to 42°, that on the pole would stand about four degrees higher; but if there was any wind, so as to prevent freezing, both the thermometers would agree."

MORRISON'S MACHINE FOR KNEADING DOUGH.

The device in the annexed engraving is intended to supercede the direct application of muscular power rarely employed in kneading dough for bread, much less labor being required by the use of the machine and the work being more rapidly and neatly performed.

A is a box or dough receiver, having a concavity, B, extending transversely across it. On suitable uprights is hung the crank shaft, C, directly over the concavity. To each of these cranks are attached arms carrying shoes of wood at the lower end, which work in the concavity, B. They are guided by the horizontal bar, D, which forms a fulcrum for the arms,



and, in combination with the cranks, gives the shoes a curvilinear motion, by which the dough is carried under them through the box in a direction corresponding with the direction in which the shaft is turned by the handle, E.

The operation of the machine is very simple; the bottom of the box and the wooden plungers are to be covered with flour to prevent the dough from adhering, and by working the crank, the dough is compressed and carried gradually under the shoes as may be desired. It can be worked by hand or steam power, is simple, and not liable to get out of order, and can be used for working butter as well as kneading dough. Letters Patent were granted through the Scientific American Patent Agency, Oct. 1, 1867, to W. B. Morrison. For the purchase of rights or machines application should be made to Morrison & Baker, Muskegon, Mich.

THE DAY LINE—CORRECTION.—The correspondent whose diagram on the above subject we published on page 324, current volume, thinks the line is placed ten degrees too far to the east. Those of our readers interested in this subject will please notice. We merely followed the draft sent.

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NEW YORK, SATURDAY, DECEMBER 7, 1867.

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THE IMPORTANCE AND DIFFICULTY OF THE PUDDLING PROCESS---LATE IMPROVEMENTS IN MECHANICAL PUDDLING.

Of all the processes in the manufacture of malleable iron, from its existence in the ore to its delivery in merchantable shapes, that of puddling is not only the most laborious and difficult, but it is probably the most important. It is in this stage of its manufacture that the quality of the iron is determined to a very great degree; no matter how excellent the pig may be, either unskillfulness or carelessness in this process will spoil the quality of the product. Those who have never seen a puddler at work, standing, as he is frequently compelled to do, from one half to three quarters of an hour before a partly opened furnace door, can scarcely form an idea of the severity of this labor. So onerous is it, that it is with great difficulty that men can be found fit for this duty, both on account of its tax on their powers of endurance and also because of the skill required in the manipulation of the partially molten metal.

The writer has seen many instances in his experience, of puddlers actually dropping down before their furnaces, prostrated and exhausted by the heat, and in one large iron establishment, numbers of these men are continually incapacitated for work by the exhaustive character of their labor. Many of them instead of feeling brisk and in good spirits in the morning before commencing their day's work actually dread returning to the works, knowing very well what suffering they will have to go through before a day of toil is finished. What makes this labor more unbearable than it otherwise might be, is the fact that it is only a part of the puddling process that requires skill, at other times the puddler is merely exhausting himself by performing manual labor.

The object of puddling, it may be well to observe, is to expose the partially liquid iron at a sufficiently high temperature, to the oxygen passing through the furnace, so that it may be deprived of its carbon, and it is in this part of the operation that the mass requires incessant stirring in order to bring every portion of it under the influence of the fire. Thus far but comparatively little skill is necessary, but when at the latter part of the operation the iron acquires a pasty consistency, the skill of the workman is demanded to form the pasty mass into the required number of balls for the rolls, squeezer, or hammer.

One of the results aimed at in the puddling process is to bring the iron up to the "boil," as it is termed, while the furnace is at its greatest temperature, and to accomplish this the most rigorous and incessant stirring is necessary, but during this stage so exhausting is the drain on the powers of endurance of the workman, that the closest oversight will not prevent him from adopting means to lower the heat of the fire, to which he is exposed, by lowering the damper, and to hurry the iron into an improper boil by throwing upon it wet slag or refuse. It is almost unnecessary to say that this treatment, if it does not ruin the product of his labor, so deteriorates it as to make what is termed cold short, a comparatively useless iron. Those who have visited iron works can scarcely fail to notice that the workmen close the dampers, in many instances as soon as the iron is melted, at the very time the highest temperature is required to carry off the superfluous carbon and other impurities. We have thus spoken at length of the puddling process in order to show its great importance and the difficulties attending it when it is carried out as it should be in order that the best quality of iron may be produced; and the reader can now fully appreciate the vast importance of the application of mechanism to this department of iron manufacture, in order not only that the puddler may be relieved of that part of his labor which requires but little skill, and that the iron may be effectually stirred while the furnace is burning its fiercest, but also to enable him to give more attention to the latter part of the operation where his skill is most required.

Several plans have been advanced to accomplish this end, and of those which we have seen, that of Morgan, of England, appears to be the most practical and to have fewer objections than any other. That a description of this apparatus may be clear to those of our readers who have not given attention to iron manufacture, we will state that the process of puddling is carried on in what is known as a reverberatory furnace; that is, one in which the material to be subjected to the heat of the fire is not brought in contact with the fuel, but is placed on a sort of hearth a short distance in front of the furnace grate, between which and the material a bridge wall intervenes. This bridge and the top of the furnace is so curved that the flame of the fire urged by a powerful draft impinges on the substances placed on the hearth. In the present case the iron is placed there and it is through a door opening upon it that the puddler performs his manipulations.

In the apparatus of Morgan a vertical shaft passes through the top of the furnace directly over the center of the hearth where the iron is placed. Fastened to the bottom of this shaft, which is kept revolving by means of bevel gearing driven by steam power is an arm fitted with four fangs or prongs, each one about the size of a puddler's "rabble." These prongs stir the iron by moving at the necessary speed, when it is in a liquid state, and thus purify or refine it much more thoroughly than can be accomplished in the ordinary way by a man poking the mass through a partially opened door. There is no necessity, by this method of closing the dampers, to reduce the draft because no one is annoyed by the unendurable temperature, but the furnaces can be urged to their utmost, and that, too, at that stage of the process which requires the greatest heat. As soon as the iron acquires its pasty consistency the mechanical "rabble" or stirring iron is withdrawn by the assistance of the usual balance weights through a hole in the top of the furnace which is closed by a fire-brick stopper. After it is withdrawn it is immersed in a tub of water which is moved to the proper place by a truck running on a track, and the stirring tool is ready for the next batch of iron. As this mechanical rabble revolves in a circle it will be seen that the hearth of the furnace, where the iron is placed, will require to be changed from the usual oval to a circular shape. This is, however, a change very easily made and one which in new furnaces would not increase the cost of construction.

To recapitulate what we have already partially stated, it will be seen that this contrivance is a step in the right direction, and if practical difficulties are not found to exist to prevent its application, the process of puddling will not only be rendered much more perfect as regards the quality of the product, but the labor of the puddler will be shorn of its horrors, and no doubt the number of heats that he is now able to get out in a given time will be increased to a very considerable extent; and still further, workmen of intelligence who would now shrink from the terrible labor of a puddler, would no doubt gladly take up with this department of iron manufacture. The consequence would certainly be a great increase in the quality of wrought iron and would perhaps enable it to hold its own in some of those branches of the arts where steel is now disputing the supremacy. We are not among those who think that steel is destined to entirely supersede wrought iron; the fibrous and ductile character of superior wrought iron has not yet been reached by the steel makers, except perhaps in rare instances, and then a considerable quantity of a uniform character could not be counted on.

There are several directions in which the successful introduction of mechanical puddling will lessen the expense of iron manufacture, among which is the saving of what is technically termed the fetling lining of the furnace; the longer the iron remains in a liquid state the more will this lining be eaten away and the iron must of course remain longer in the liquid state by the old method than by the proposed mechanical process, for the reason that by the former a very much longer time must be taken to stir it sufficiently to deprive it of its impurities than by the latter, where the stirring may be much more powerful and efficient. Before taking leave of this interesting and important department in this great industry, we must say that we cannot call to mind anything in the mechanical line which demands improvement more than the process of puddling.

A REMARKABLE SUMMER EXCURSION.

One pleasant morning last June, a goodly company of ladies and gentlemen—some 75 in number—embarked from the foot of Wall street, New York, on the fine steamer *Quaker City*, for an excursion to that most attractive of all parts of the world, the Mediterranean. Along its classic shores they coasted during the entire season, visiting every memorable and interesting place. Oftentimes they made diversions to the interior; but they were usually glad to escape from the land heats of the day, to enjoy cool and refreshing sleep on board the ship at night. They first landed at the peninsula of Gibraltar, and some of them journeyed thence through Spain, France, Switzerland, and Italy, joining the ship again at Naples. Thence they passed on to Athens, Constantinople, Sebastopol, and Odessa, at which latter place they visited the Palace of the Emperor of Russia, by whom and his interesting family they were most cordially and splendidly entertained. Returning they visited Smyrna, Beyrout, Jaffa, Damascus, Jerusalem, Sea of Galilee, the Dead Sea, Thebes, Alexandria in Egypt, the Nile, the Pyramids, Algiers, Malta, Cadiz in Spain, Madeira Islands, and the Bermudas, arriving safely home, a few days ago, after an absence of only five and a half months. It is one of the most novel, remarkable, and successful excursions that we remember to have heard of. There were no accidents, no sickness, every place laid down in the programme was faithfully explored, and not a single rainy day interfered with the projects of the party. How much more rational to spend a summer among such interesting and wonderful scenes, filling the mind with useful knowledge, than to be cooped up in a hot hotel at some fashionable watering place. The excursion we have described was projected and commanded by Capt. Duncan, of Brooklyn, N. Y. The complete success of this first enterprise will, we trust, encourage him to a renewal every year. As soon as the Pacific Railroad is completed a pleasant summer excursion may extend from New York to China, Japan, and back.

PATENTS IN CANADA TO AMERICAN CITIZENS.

We are glad to see that the subject of amending their patent laws is about the first thing that engages the attention of the New Canadian Parliament. A telegram from Ottawa dated the 22d says:

In the House last night the following notice of motion was given: Whether it is the intention of the Government to extend to citizens of the United States the same facilities for obtaining patents in Canada that are afforded to citizens of the Dominion, and whether the privileges to order patents now enjoyed by the United States in the Province of New Brunswick are to extend to other parts of the Dominion.

In addition to the above we have private advices from prominent citizens in the Provinces stating that there is but little doubt but that a bill will pass early in the session extending the same rights to citizens in the States to obtain patents as is accorded to residents of Canada.

Mr. Legge has favored us with a copy of his pamphlet showing the importance of a radical amendment in their laws. He says:

Among the British Provinces in America, we find that New Brunswick and Newfoundland have wisely shaken off the shackles of prejudice and exclusiveness, and allow all foreigners to obtain patents on the same terms as are granted to their own citizens. By this arrangement, the inhabitants of these colonies or provinces are permitted to obtain patents in the United States for the reduced fee of $35, in place of the discriminating fee of $500 charged to the inhabitants of Canada, Nova Scotia, and Prince Edward Island, in return for their exclusiveness in not permitting American citizens to obtain Letters Patent on any terms, even by the payment of an equally large fee.

The United States Patent Law is so framed that as soon as we cease to discriminate against their citizens in the granting of patents in the Dominion of Canada, their fee at once drops from $500 to $35, without additional legislation.

The proposed change in our laws, by which this good result would be obtained, will at once open a market of 35.000-000 of enterprising, wealthy, and speculative people to our Canadian inventors, as all wishing to apply could afford to pay the lesser fee of $35, while but few can pay, in the first instance, the larger fee, $500. In return for 35,000,000, given to our inventors, we give theirs but about one-tenth the number, and as our inventors, as a class, will equal, if not excel, those of the United States, in point of ability, we have a large margin in our favor, by the proposed alteration. From this it is evident that if in the new law we adhere to the exploded exclusive principle, it will result, to use a common but forcible expression, in "cutting our own throats," without doing much harm to our neighbors.

Evils of Tight Lacing.

Sometime ago the death of a young lady passenger, Miss Stainsby, in one of the cars of the London underground railway was reported, caused, as then alleged, by suffocation, due to the bad state of the air in the tunnels. A legal investigation ensued from which it now appears that one of the causes of her death was tight lacing.

Prof. Rodgers, lecturer on medical jurisprudence and on chemistry, was the first witness, and at his request the evidence of Dr. Popham as to the appearance of the body was read to him.

Dr. Popham added that he had found the deceased was tightly laced, and that the result would be to compress her chest and impede the free action of her lungs.

Prof. Rodgers said he had examined samples of air taken on four different occasions from the tunnels of the Metropolitan Railway, and also from various other tunnels. The air in its pure condition contained 2,080 volumes of oxygen per 10,000, and from 3·7 to 6·2 of carbonic acid. On the 4th of September he found that in the worst tunnel (*i. e.*, Gower street), there were 1,870 measures of oxygen, and there was but a slight trace of carbonic acid. The highest amount of carbonic acid he had found on any one occasion was 18·7 per 10,000; but the atmosphere of a theater four feet above the stage was 23·7. The slight deficiency of oxygen which he found would not act injuriously, even upon delicate persons, passing as they did, rapidly through the tunnel in trains. Thought that under the circumstances under which the deceased had entered the train—that was to say, considering that she had eaten heartily, was tightly laced, had diseased heart, and was already faint before she entered the tunnel—her death had resulted from natural causes. The jury heard other evidence, and then, without hesitation, brought in a verdict:—"Died from natural causes."

PETROLEUM TRIALS.—We trust that soon we shall be favored with exact information respecting the trials under government patronage of petroleum as a fuel for generating steam in marine boilers. The Chief of the Naval Bureau, B. F. Isherwood, will give these results in the Annual report of the Secretary of the Navy, and a more complete technical report, with full details, drawings of the boilers, etc., will be published in a few months afterward.

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OFFICIAL REPORT OF PATENTS AND CLAIMS

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Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat.....$10
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
On appeal to Commissioner of Patents.....$20
On application for Reissue.....$30
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On granting the Extension.....$50
On filing a Disclaimer.....$10
On filing application for Design (three and a half years).....$10
On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

70,933.—STEP-LADDER.—M. E. Abbott, Bethlehem, Pa.

I claim a step-ladder, with the braces, B B', and the stay rods, C C', and D D', attached to the ladder, A, substantially as described, that is to say, by the pivot joints, d d, and the long staples, a a, and c c, as and for the purposes set forth.

In combination with a step-ladder, I claim the pivot joints, a a, and the long staples, a a, and c c, or their equivalents, substantially as and for the purposes described.

70,934.—APPARATUS FOR CONDENSING AIR.—Onofrio Abruzzo, New York city.

I claim the arrangement of a series of vessels, A A', when the same are connected with cylinders, B B', the same being provided with valves, C C', and with perforated pistons, D D', having valves, substantially as and for the purpose herein shown and described.

70,935.—LAMP CHIMNEY.—E. R. Addison, Wheeling, W. Va.

I claim the combination with the glass bulb, A, of the metallic or mica chimney, D, secured by tight joints, a and e, to the upper edge of the bulb, substantially as described and represented.

70,936.—TYPE CASE.—Charles Aldrich, Marshalltown, Iowa.

I claim a cabinet or case, made in sections or parts, hung so as to open and close, and each provided with shelves, substantially as and for the purpose described.

70,937.—JOINERS' GAGE.—Mason C. Ames (assignor to himself and Jeremy W. Bliss), Hartford, Conn.

I claim, as a new improved article of manufacture, a carpenter's gage, composed of the bar, A, head, B, clamp screw, C, and constructed to operate substantially as and for the purpose described.

70,938.—HOOK FOR HOLD-BACK STRAP.—William A. Bagley, Ansonia, Conn.

I claim a hook for hold-backstraps, made in two parts, B, and pivoted part, C, substantially as described.

70,939.—BOLT MACHINE.—Albert R. Bailey, New Haven, and Wilson W. Knowles, Plantsville, Conn.

We claim, 1st, The fixed jaw, O, and the sliding jaw, O', in combination with the supplemental die, Q, and die, M, all constructed and arranged to operate substantially in the manner as and for the purpose set forth.

2d, The cross head, E, slide, J, attached thereto, and independent slide, K, arranged substantially as shown, for operating the heading die, M, sliding jaw, O', and supplemental die, Q, as set forth.

70,940.—HARNESS BUCKLE.—Alonzo E. Bailey, and Horatio Nichols, Middleville, N. Y.

We claim, 1st, The trace buckle, constructed as described, consisting of the frame, D, with curved forward end, and provided on each side with stop, F, which serves as a limit to the forward movement of the sliding clasp, E, embracing the frame, as herein set forth, for the purpose specified.

2d, In combination with the above, we claim the trace strap, R, when provided with the enlarged part, H, secured to the frame, D, by means of the slide, E, substantially as described, for the purpose specified.

70,941.—ELEVATOR.—Cyrus W. Baldwin, Boston, Mass.

I claim, in an elevator or hoisting apparatus, as described, the combination with the elevator carriage and rope, or other device for supporting or suspending the same, of the wedges for preventing the accidental fall of said carriage, under the arrangement and for operation as set forth.

I also claim the combination and arrangement with the carriage, A, and its supporting rope, of the levers, H H, ropes, a' a', and wedges, G G, or their equivalents, substantially in manner and for the purpose as before described.

70,942.—SCALES.—Isaac Benham (assignor to himself and Allen B. Benham), McLean, N. Y.

I claim a proportioning scale for ascertaining, in compounds of ingredients in fixed proportions, the quantity of any one ingredient, by the use of any other ingredient as a weight or measure, in the manner and by the device above set forth, as a new article of manufacture.

70,943.—APPARATUS FOR THE MANUFACTURE OF SALT.—Henry Beschkee, Albany, N. Y.

I claim the arrangement and combination of the soaking pan, K, drying pans, D and E, with the zigzag flues, P and T, when arranged and operating as herein described, and for the purposes set forth.

70,944.—BUCKLE.—Edward C. Blakeslee, Waterbury, Conn.

I claim the herein-described buckle, in which the tongues, B B, and loop, C, are formed in one piece, and so as to form bearings, a a, which are hinged to the frame in the manner set forth.

70,945.—DOOR CATCH.—Asa Blood, Jr., Independence, Iowa.

I claim the adjustable spring, C, head, E, as arranged in combination with the arms, B, for the purpose and in the manner set forth.

70,946.—WIRE WORK.—Wannibald R. Boerner (assignor to himself and Carl R. Boerner), Chicago, Ill.

I claim wire work to be used for any purpose, when constructed substantially as herein described.

70,947.—PADDLE-WHEEL.—Edward T. Bostrom, Newnan, Ga.

I claim the construction of four buckets, C, upon the revolving shaft, D, arranged upon the ends of the radial revolving arms, B, substantially as described, for the purpose specified.

70,948.—STEAM ENGINE.—Eugene Bourson, Brussels, Belgium.

I claim, 1st, Connecting both ends of a steam cylinder by means of a pipe, C, having one or more stop cocks, a, substantially as described, so as to enable the engineer to stop or retard the motion of the piston, by conducting steam or water, or both, into the ends of the cylinder, substantially as herein shown and described.

2d, The pipe, C, connecting the ends of the cylinder, when provided with the stop cocks, a a, and when combined with the blow-off pipes, c c, all made and operating substantially as herein shown and described.

3d, Connecting the two cylinders of a locomotive engine with each other by means of a pipe, F, whereby steam, water, or both, can be conducted into the ends of the cylinders, substantially as and for the purpose herein shown and described.

70,949.—CHILD'S TOY.—George W. Boynton, Auburn, N. Y.

I claim the hollow wheel, A, loop, h, weight, g, and image, B, all combined and arranged as and for the purpose set forth.

70,950.—HEAD BLOCK FOR SAW MILL.—Charles H. Brookbank, Connersville, Ind.

I claim, 1st, The rod, E, provided with the adjustable toothed slides, n, and operated by means of the lever, F, pivoted to the carriage, and connected to said rod by means of the sliding sleeve, h, and bar, g, all arranged as described, for the purpose specified.

2d, The pins, k k, and sliding sleeve, h, regulating the stroke of the lever F, whereby the movement of the head block is determined, as herein shown and described.

3d, The pinion, b, having formed upon its inner side the ratchet wheel, c, turning loosely upon the screw shaft, C, and connected to the wheel, d, by the pawl, e, and spring, f, as herein described, and operated to move the head block forward by the ratchet bar, E, and to withdraw said head block by means of the crank, l, independent of the ratchet rod, all arranged as described, for the purpose specified.

4th, The arrangement of the pivoted lever, F, connected by the bar, g, and slide, h, to the ratchet rod, E, the screw rod, C, pinion, b, ratchet, c, crank wheel, d, pawl, g, spring, f, and head block, D, as herein set forth for the purpose specified.

5th, Feeding the log to the saw the required distance at one stroke of the lever, F, through the medium of the ratchet bar, E, pinion, b, ratchet, c, wheel, d, and screw rod, C, as herein shown and described.

70,951.—MACHINE FOR GRINDING SAW TEETH.—Ira S. Brown and Charles N. Brown (assignors to themselves and J. Mason Gross) Providence, R. I.

We claim the combination of a grinding wheel, A, with an apparatus for holding the saw-tooth, or other article to be ground, which apparatus for holding the tooth or other article consists of the standard, E, the hinged frame, I I, and the vise, F, combined therewith as described, all arranged so as to effect the presentation of the article to be ground to the wheel, substantially as described.

70,952.—FAN.—Otto Brück, New York city.

I claim the tubular handle, a, into which slides the tube, b, which is adapted to receive the fan, d, in its folded state, in combination with the tube, b, head, e, fan, d, and draw strings, f and g, the whole arranged and combined substantially as herein set forth.

70,953.—MARKER FOR PLANTING CORN.—John Burnham (assignor to himself and David L. Hough), La Salle, Ill.

I claim a two-wheel marker, which is constructed so as to operate substantially in the manner herein described.

70,954.—HORSE SHOE.—Irvine Carman, Schoolcraft, Mich.

I claim, 1st, The spring, B, fitting into the walls of the shoe, substantially as shown and described.

2d, The combination of the rubber, C, with the spring, B, substantially as shown and described.

70,955.—TOWEL.—John Cash, and Joseph Cash, Jr., Coventry, England.

We claim, as a new article of manufacture, bath or friction towels, manufactured of tape, substantially as described.

70,956.—APPARATUS FOR DISTILLING SPIRITS OF TURPENTINE.—David Cashwell, Fayetteville, N. C.

I claim, 1st, The application of steam to the distillation of spirits of turpentine, as herein described.

2d, The induction steam pipe, a, the steam heating coils, b, b', and the diaphragms, c c, combined with the still, A, the steam-generator, D, and the worm, B, arranged and operating substantially as and for the purposes shown and described.

70,957.—TIP WAGON.—Stephen Chamberlin, Boston, Mass.

I claim the combination and arrangement of the body, a, rocker springs, n, journals, r, and socket bearings, s, together and relatively to the spring, l, and front and rear axles, substantially as described.

70,958.—IRONING TABLE.—Albert A. Chittenden, Boston, Mass.

I claim the movable table, A, in combination with the rod, B, and frame, C, or their respective equivalents, substantially as and for the purpose described.

70,959.—CHURN.—Charles Colby (assignor to himself and Michael O'Neil), San Francisco, Cal.

I claim the combination and arrangement of the driving shaft, B, gears, C and E, with gears, D and F, at the opposite end of the churn, with the dashers, H and K, and barrel, L, all as described, for the purpose set forth.

70,960.—DITCHING MACHINE.—Robert Conarroe (assignor to himself and Howard Young), Camden, Ohio.

I claim, 1st, The shovels of the elevating apparatus, the plates, r, of which automatically clean the plates, o, substantially as set forth.

2d, The notches, n, and pins, v, in combination, when applied to a wheel and axle, substantially as described.

3d, The plow, G, trough, F, elevating apparatus, H, e e, h h, cutters, C, and lever, w, when combined and arranged substantially as described.

70,961.—STOVE-PIPE DRUM.—Jesse Conver, Philadelphia, Pa.

I claim cylinder, c c, damper, D, holes, H H, and H' H', and K K', constructed and combined with plates, A A, B B, A' A', B' B', A'' A'', and cone plate, B'' B''. in the manner and for the purpose set forth and described.

70,962.—HORSE HAY FORK.—A. J. Cook, Guilford, Conn.

I claim the combination of the slotted rod, A, the bar, D, the lever, E, and prongs, C, when the said bar, D, extends from the said lever upon one side of the rod, through the rod to the prong upon the opposite side, substantially as and for the purpose herein set forth.

70,963.—GATE.—William Cooley, Tafton, Wis.

I claim, 1st, The lever, R, made to rest on the top of hinge, G, in combination with sleeve, S, gate, F H O V C D, and support, J, the whole being arranged substantially as set forth and for the purpose described.

2d, The combination of the sliding post, K, with gate, F H O V C D, hinges G G, lever, R, and catch, n, substantially as herein specified.

70,964.—LOOM.—H. M. Cooper, Lindley, Mo.

I claim, 1st, The combination of the lay, C, the treadle-cam shaft, H, the treadles, G, the cloth beam, D, the shuttle driving hand, p, the levers, r r, the cams, s s, the spring bar, w, and the cross bar, v, constructed, arranged, and operating as and for the purposes herein described.

2d, The combination and arrangement of the lever, m, pivoted near its lower end to the frame of the loom, and provided at its upper end with the screw thread by means of which the hinged pawl, k, is raised or lowered, with the connecting rod, n, sword, C', cloth beam, D, gear wheels, g g1, g2, and ratchet wheel, h, as herein described, for the purpose specified.

3d, The arrangement of the pivoted hand, p, the levers, r r, the cams, s s, the spring bar, w, and the cross bar, v, combined with the lay, C, and the shuttle-drivers, o o, substantially as and for the purposes described.

4th, Connecting the shuttle-boxes, t t, with the lay-by hinges, as and for the purposes set forth.

70,965.—MOLD FOR MAKING CORES FOR CASTING GLOBE VALVES.—John M. Cooper, Pittsburg, Pa.

I claim the core boxes, x and x', with their respective plugs, g and g', constructed substantially as hereinbefore described, for the purpose of forming cores for casting globe valves with diaphragm valve seat.

70,966.—TRY SQUARE.—J. E. Cowdery (assignor to himself and A. S. Benson), Wheatland, Iowa.

I claim the circular rack, E, and spring pawl, e, when combined with a pivoted blade, to a try-square, in manner substantially as and for the purposes described.

70,967.—WASHING MACHINE.—William W. Cox, Carbondale, Ill.

I claim, 1st, The corrugated roller, C, in combination with the roller, F, apron, G, dovetail blocks, h, springs, k, and nuts, l, all made and operating substantially as and for the purpose herein shown and described.

2d, The above, in combination with the treadle, E, when the same is made as set forth.

70,968.—TOOL SUPPORTER OR RACK.—Zenas M. Crane, Dalton, Mass.

I claim the combination of the bent lever, A, the adjustable tooth, e, and the jaw, g, applied to the plate, B, and arranged substantially as described.

I also claim the combination and arrangement of the projection, h, with the bent lever, A, the adjustable tooth, e, and the jaw, g, applied to the plate B, and arranged substantially as specified.

70,969.—MANUFACTURING BRICKS.—E. W. Crittenden, Pittsburg, Pa.

I claim, 1st, The fluted or corrugated rollers, B B' B'', a rotary screen, D, and endless carrier or apron, F, arranged substantially as and for the purpose set forth.

2d, The tempering or moistening of the pulverized clay by jets of low-pressure steam from a steam box, H, substantially as shown and described.

3d, The evener, G, the rotary screen, D, and endless carrier or apron F, arranged substantially as and for the purpose specified.

4th, The molds, N, in the wheel, L, in combination with the plungers, O, and the arms, Q, operated in the manner substantially as herein shown and described.

5th, The elevator, I, and endless carrier, V, when used in combination with a rotary mold wheel, substantially as and for the purpose specified.

70,970.—MILL GEARING.—Joshua C. Cunningham, Oglethorpe, Ga.

I claim the pinion wheels, C, each composed of two sets of cogs and of unequal diameters, in combination with the base, A, crown gear wheel, B, and shafts, F, all arranged and operating as described, for the purpose specified.

70,971.—LOAF-BREAD MACHINE.—John D'Arcy, San Francisco, Cal.

I claim the combination and arrangement of the kneading rollers, C C', endless apron, a, carried by the rollers, D and D', and the rotating knife, F, all as set forth.

70,972.—PLOW.—Jonathan R. Davis, McKay, Ohio.

I claim, 1st, Forming the beams, A B, standards, E, brace bars, G, and handles, H, and adjustably connecting them to each other, substantially in the form and manner herein shown and described and for the purpose set forth.

2d, The combination of the jointed or pivoted bars, C and I, with the beams, A and B, and handles, H, substantially in the manner herein shown and described and for the purpose set forth.

70,973.—BOTTLE WASHER.—Henry B. Davison, San Francisco, Cal.

I claim a bench or support provided with a series of holes, B B, to hold the bottles, in combination with a series of jet pipes, D D, extending into the nozzles of the bottles, and conducting water to wash them, substantially as described.

70,974.—TRUNDLING HOOP.—John G. De Coursey, Philadelphia, Pa.

I claim the hoop, A, with its hub, b, and spokes, a, in combination with an arm or handle, C, connected to the said hub, substantially as and for the purpose described.

70,975.—BOOT TREE.—Peter De Vries, Adrian, Mich.

I claim the combination of the front and foot, A B, made in one piece, the back, C, the spreading key, K, the lever, I, elastic plate, i, vertical screw, G, and horizontal screw, H, all arranged and employed in the manner and for the purposes set forth.

70,976.—HARVESTER RAKE.—Wm. P. Dillman, Joliet, Ill.

I claim, 1st, The arrester, c, attached to the outer grain guard of the platform, and inclined toward the inner end of said platform.

2d, A grain arrester so constructed that the revolving rake passes under its outer end.

3d, The arrester, c, constructed as described, in combination with the rake b, or its equivalent.

70,977.—CENTER BOARD.—Felix Dominy, Penataquit, N. Y.

I claim the center board, A, constructed as described, when provided at its forward upper end with the sliding bar, E, by which it is raised or lowered, substantially as herein shown and described.

70,978.—ROCK-DRILLING MACHINE.—George Downing (assignor to himself and Robert Hermance), Schuylerville, N. Y.

I claim, 1st, The crank wheels, I, in combination with the shaft, H, double cams, G, drill spindle, B, sliding plate, C, and upright part, D, as herein set forth, for the purpose specified.

2d, The combination and arrangement of the lever, N, spring, B', arm, L, pawls, K and C', and ratchet wheel, J, with each other and with the drill spindle, B, with its drill point, A, sliding plate, C, and crank wheel, I, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the shaft, O, toothed wheels, P, pawls, S and V, arm, T, and racks, R, with each other and with the sliding plate, C, and upright part, D, of the frame of the machine, substantially as herein shown and described and for the purpose set forth.

4th, The upright part, D, of the frame, connected to the horizontal part by means of the hinges, X, and adjustable hooks, y, substantially as herein shown and described and for the purpose set forth.

70,979.—AUTOMATIC VENTILATING STOVE.—Richard Eaton, London, Eng.

I claim, 1st, The combination with a ventilating stove of an automatic apparatus for operating the direct draft register or damper, and the ventilator damper, so as to transfer the draft from the one to the other, and regulate the same, substantially as and for the purpose set forth.

2d, The combination with the ventilating stove, A B D E F, of the damper or register, C, damper, G, rod, L, lever, I, and connections, I J K, or their equivalents, arranged and operating substantially as and for the purpose described.

3d, The weight, M, applied and operating in connection with an automatic ventilating stove, substantially as and for the purpose specified.

70,980.—RUNNING GEAR FOR VEHICLES.—Solomon J. Edwards, New Berlin, N. Y.

I claim in combination with sleeve, C, and set screws, d d, arms, B B, boxes g g, and rollers, e e, when all are constructed and arranged as and for the purpose set forth.

70,981.—LOCK FOR TRAVELING BAGS.—Hermann Fautz (assignor to himself and Joseph H. Ferreira), Newark, N. J.

I claim the levers, A A, or their equivalents, in combination with the springs, c c, catches, E E, and knob, G, substantially as specified and for the purpose named.

70,982.—SAFETY ATTACHMENT FOR POCKETBOOKS.—Wm. H. Ferguson (assignor to himself and Clark D. Page), Rochester, N. Y.

I claim, 1st, The combination and arrangement with the parts, A B c, of the fastening, of the spring, E, provided with the reverse bends, f h, forming respectively the finger rest and the eye, the whole operating in the manner and for the purpose specified.

2d, As a new article of manufacture, the fastening for pocket books consisting of the plates, A B, provided with the points, a a, and attached to the leather disk, b, the whole arranged as described, and operating in the manner and for the purpose herein set forth.

70,983.—PEAT AND BRICK MACHINE.—George B. Fisher, Chicago, Ill.

I claim in combination with a cylinder provided with a series of molds and plungers, operating as described, the arrangement of a chain of blocks, D, for covering said molds, substantially as specified and described.

70,984.—MEAT SPIT.—Paul Fisher, Williamsburg, N. Y.

I claim the skewer plates, B, provided with the skewer, C or D, in combination with the body, A, of the spit, substantially as described for the purpose specified.

70,985.—ROTARY SWING.—I. N. Forrester, Bridgeport, Conn.

I claim, 1st, Rotating a swing or swings at once around horizontal and vertical axles, substantially as herein shown and described.

2d, The revolving platform, C, arranged around the post, B, and provided with uprights, D D, in combination with the swing frames, E, and their axles, b, all made as set forth.

70,986.—BOTTLE STOPPER.—Howard B. Fox, Oxton, and James T. Hall, Liverpool, Eng.

We claim, 1st, A stopper formed or wood and cork in combination, forming a cheap and durable stopper, substantially as and for the purposes herein set forth.

2d, The within described construction and arrangement of the rigid parts, a1 a2 a3, having three different diameter, and fitted within and upon the elastic part, b, in the manner and for the purpose herein set forth.

70,987.—MACHINE FOR PICKING HAIR.—Franklin Frey, Liberty, Ill.

I claim the cylinders, D D', and adjustable floor, G, suspended in the rod, c and having concave surfaces corresponding to the cylinders, provided like them with teeth, e e', in combination with the box, A, and feed table, H, the whole being arranged to operate as and for the purpose described.

70,988.—BREAST PUMP.—Wm. T. Fry, New York city.

I claim, 1st, The tube, d, flexible at its outer end, in combination with a receiving vessel, A, and with a vessel, D, or equivalent device, for exhausting the air from the vessel, A, substantially as and for the purpose described.

2d, The valve case, B, consisting of detachable caps, m n, with their openings, e i i, and the vibrating disk, s, the whole being constructed and arranged substantially as specified.

70,989.—BEEHIVE.—Jacob Gatschet, York Township, Ohio.

I claim, 1st, The case, A, when constructed and put together in the manner and for the purpose set forth.

2d, The inclined plane, B, in combination with the frames or sash, g g g, when said sash are constructed as and for the purpose described.

3d, The cap piece, C, in combination with sash, D D, as and for the purpose specified.

4th, Inclined plane, B, sash, g g D D, cap piece, e, and glass frame, k and B, all arranged as and for the purpose set forth.

70,990.—MANUFACTURE OF WHITE LEAD.—Isaac M. Gattman, New York city.

I claim, 1st, Subjecting a strong and hot solution of the basic acetate of lead to a current of carbonic acid gas, substantially as and for the purpose herein described.

2d, Applying steam in connection with a current of carbonic acid gas to a strong and hot solution of basic acetate of lead, substantially as and for the purpose specified.

3d, Correcting defective precipitate of neutral carbonate of lead formed by the current of carbonic acid gas when the solution of basic acetate of lead may be too weak, by boiling it in a stronger solution of basic acetate of lead, as herein set forth.

4th, The manufacture of pure amorphous white lead by the method substantially as herein described.

70,991.—VIOLINS AND OTHER BOW INSTRUMENTS.—George Gemünder, New York city

I claim, 1st, Arranging an additional sound post, D, within the case of a bow instrument, substantially as and for the purpose herein shown and described.

2d, Combining the additional sound post, D, with a string, E, which passes over it, substantially as and for the purpose herein shown and described.

3d, Connecting the sound posts of a bow instrument by means of a string, E, and the tail piece, F, with the main strings of the instrument, substantially as herein shown and described.

4th, The bridge, C, for connecting the post, D, with the main sound post, B, substantially as and for the purpose herein shown and described.

70,992.—BOOT HEEL CUTTER.—Benj. F. Goddard, Charlton Depot, Mass.

I claim, 1st, A device for cutting boot and shoe heels, composed of a plurality of dies of different sizes, arranged to operate in the manner substantially as shown and described.

2d, The rising and falling die, D, and rod, E, arranged to operate in connection with the die, C, substantially as and for the purpose ses forth.

3d, The slide, F, in combination with the dies, D C G I, arranged to operate substantially as and for the purpose specified.

70,993.—CHIMNEY COWL.—B. J. Goodsell, Pent Water, Mich.

I claim, 1st, The combination of two polygonal slotted caps, G and H, or of a single cap having double side walls, with the top of the chimney, said cap or caps being constructed and arranged substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the interior pipe or flue, C, and exterior ventilating pipe, D, with each other, with the chimney, B, and with the polygonal slotted cap or caps, G H, substantially as herein shown and described and for the purpose set forth.

70,994.—ICE CUTTING MACHINE.—Wm. F. Gordon, Detroit, Mich.

I claim the combination and arrangement of the runner, A, the traction wheels, B, the gear wheels, C D, pinions, E F, the ratchets, H H, the shafts, K L M N, the circular saw, O, the skate rudder, P, the slipping collar, S, the guide lever, T, the seat, V, the shafts, W, the frames, X X, and 4, 4, the driving wheel, Y, belt, 2, pulley, 3, and the marking rod, 7, all arranged substantially as described and for the purpose designed.

70,995.—FURNACES FOR ROASTING ORES.—Henry Goulding Silver City, Nevada.

I claim, 1st, The roasting of ores in molds or chambers, substantially as described.

2d, The arrangement of molds containing ores to be roasted, so that they can be gradually brought nearer the fire or removed from it, substantially as described.

3d, Removing the molds containing ores from the fire while undergoing the process, so that the decomposition may be conducted without additional heat, substantially as described.

4th, The placing of a freshly filled mold containing unroasted ore upon the top of a mold that has been removed from the fire, for the purpose of utilizing the excess of heat, substantially as described.

5th, The arrangement of furnace, cooler, and crane, as described, for the purpose described.

6th, The conducting of the flue through water, or its equivalent, for the purpose of condensing the volatile matter, when used in connection with ores roasted in molds, substantially as described.

70,996.—APPARATUS FOR MOLDING COLLARS.—Solomon S. Gray, Boston, Mass.

I claim a combined gage and mold or former for placing and shaping paper collars, constructed and operating, substantially as described.

70,997.—DIE FOR SWAGING HAMMERS.—Henry Hammond, Hartford, Conn.

I claim the peculiar manner of constructing hammers herein set forth, by means of dies and punches of the form described.

70,998.—DIE FOR FOMING THE CLAWS OF HAMMERS.—Henry Hammond, Hartford, Conn.

I claim, 1st, The combination of the dies, a and b, and cutter, c, all constructed and arranged substantially as described.

2d, In combination with the dies, a and b, and cutter, c, I claim the cam, K, arranged and operating substantially as described.

70,999.—CONCRETE BRICK MACHINE.—Mortimer S. Harsha, Batavia, Ill., assignor to himself and Lavias F. Dow, Cortland, N. Y.

I claim, 1st, The combination of the mold composed of the slides, D C, and the bottom, X, the plunger, E, and the jointed lever, I, all arranged substantially in the manner and for the purposes set forth.

2d, The combination of the mold constructed of the bottom, X, and the slides, C and D, with the jointed arm, I, shaft, M, cord, r, and spring, L, or its equivalent, arranged and operating as and for the purposes specified.

3d, The combination of the mold, slides, D and C, spring, N, plunger, E, and lever, F, arranged and operating as and for the purposes set forth.

71,000.—STRAW CUTTER.—Jas. T. Harvey, Murrysville, Pa.

I claim the double edged knife, d, attached by a sash or otherwise to the inclined guide rods, i i, in combination with the metallic plates or edges, c c' and bifurcated ratchet bar, m, with adjustable arms, n n', constructed and operated substantially as and for the purposes above set forth.

71,001.—FEEDER FOR CARDING MACHINES.—George S. Harwood, Woonsocket, R. I.

I claim, 1st, In a card feeding machine such as described, the plate for carrying the traversing rolls, constructed as herein specified, that is to say, countersunk, or provided with recesses, so as to form a cap or covering for the said rolls, substantially as and for the purposes set forth.

2d, The guide or ring attached to the traverse plate, provided with a lip or guard, extending between and partly around the rollers, as and for the purposes specified.

71,002.—GAS HEATING APPARATUS.—David Greene, Haskins, Cambridge, Mass.

I claim, 1st, The combination of an air chamber, A, constructed as described, with the ring, r, the perforated tube, B, and the air supplying apparatus, E S S, or its equivalent, substantially as and for the purpose described.

2d, I claim the combination of the chamber, A, and the tube, D, provided with deflectors, and a plate or button, o, with a gas or vapor burner, substantially as and for the purpose specified.

71,003.—SHANK SPRINGS FOR BOOTS AND SHOES.—Edward Heaton, New Haven Conn.

I claim as a new article of manufacture the herein described shank spring consisting of a wood spring, A, combined with a tempered metallic spring B, united in the manner substantially as set forth.

71,004.—METHOD OF DRYING GUNPOWDER.—E. E. Hendrick, Carbondale, Pa.

I claim the dessication of gunpowder by submitting the same in vacuo to a removal of the atmospheric pressure, for the purpose and in the manner substantially as described.

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71,005.—LIGHTING GAS BY ELECTRICITY.—John M. Higgins (W. B. Culbertson, administrator), St. Louis, Mo.

I claim, 1st, The switch, S, vibrated by the rotation of the wheel on the gas cock, substantially as described.

2d, The combination of the wheel, D, with cams, d d, and the vibrating switch, S, as described.

3d, The arrangement of the clock gearing, the fan, K, the wheel, D, the escapement, L l l', and the notched wheel, Q, substantially as described.

4th, The armature, O, spring catch, o, and escapement, L l l', arranged substantially as described.

The arrangement of the spring, E, and gearing, the fan, K, cam-faced wheel, D, armature, O, escapement, L, and switch, S, substantially as described and represented.

71,006.—FIBROUS MATERIAL.—Theophilus Higginbotham, Hernando, Fla. assignor to himself, John Parsons and Eberhard Faber, New York city.

I claim producing from the plant known as the *althea frutex*, or cockleburr, fibres fit for ropes, textile fabrics, or paper, substantially as set forth.

71,007.—AIR CHAMBERS OF PUMPS.—Richard H. Hilton (assignor to Mitchell, Allen & Co.), Newbern, N. C.

I claim the tube, B, the strainer, B', ball valve, C, conical valve-seat, D, and the sediment chamber, F, arranged substantially as described, in combination with the air chamber, A, for the purpose set forth.

71,008.—SHAFT COUPLING.—George P. Hodson and James L. Hodson, Philadelphia, Pa.

We claim the within described coupling, composed of the outer portion, A, with its internal inclined ribs, h, and the inner severed portion, B, with its inclined ribbs, f f; the two portions being adapted to each other and to the shaft, and secured together, all substantially as and for the purpose herein set forth.

71,009.—WINDOW BLIND FASTENER.—Edward A. Holbrook, John E. Dodge and G. H. Marshall, Watertown, N. Y.

We claim the combination, with a hinge constructed as described, of the sliding shaft, and pinion, and locking stud, under the arrangement herein described, so that the said pinion may be locked, and its motion prevented, while it remains in gear with the crown wheel or circular rack of the said hinge.

71,010.—PANTOGRAPHIC ENGRAVER.—John Hope (assignor to Hope and Company), Providence, R. I.

I claim, 1st, Combining the carriage of the tracer, or stylus, in a pantographic engraving machine with the object table, by means of the levers, L and O, and the stud pins, h and l, operated respectively by the levers, K and N, through the rocking standards, K' and N', substantially as described for the purposes set forth.

2d, Making the index-plate, S, adjustable with reference to the surface of the roller, to be engraved by the means substantially as described.

71,011.—AMALGAMATOR.—Alfred Horn, Silver City, Nevada.

I claim, 1st, The application of a scraper or distributor, C, to an amalgamating machine or pan, for the purpose of distributing the mercury through the pulp, substantially as described.

2d, Arranging the said distributor to an amalgamating machine, so that it may be easily adjusted to the wear of shoes and dies, substantially as described.

71,012.—BOLT MACHINE.—Wm. W. Hubbard, Philadelphia, Pa.

I claim, 1st, The two hammers, F and F', one having a head and anvil for forging, and the other a head and anvil for heading bolts, in combination with a double cranked shaft for operating the hammer, substantially in the manner set forth.

2d, The connecting rods, D and D', each composed of two parts, with intervening spiral springs, all constructed substantially as and for the purpose described.

3d, The combination of plate, a, having the L-shaped slots, e, of the crank rods, with the pins, d, of the vibrating arms, E and E'.

4th, The spring levers, J and J', spindles, s and s', notched arms, v', springs, q', and the rods and chains herein described, in combination with the connecting rods, D and D', and vibrating arms, E and E', for the purpose specified.

5th, The lever, I, and shaft, p, with its arms, n' and p', in combination with the hinged block, or anvil, H, its rod, l', and the weighted chain, m.

71,013.—ICE PITCHER.—G. W. Hull, Wallingford, Conn.

I claim, 1st, An ice pitcher, or cooler, in which the bottom is corrugated, substantially in the manner and for the purpose set forth.

2d, The screw cap, a, combined with a pitcher or cooler, constructed in the manner herein described, and as and for the purpose specified.

71,014.—SPRING BED BOTTOM.—Heman L. Huntington, Chicago, Ill.

I claim, 1st, The combination of the frames, A B, springs, S, metallic strips, D, V-shaped springs, E, arranged as and for the purposes specified.

2d, The combination of the frames, A B, springs, S, strips, D, and straps and buckles, F G, substantially as and for the purposes specified.

3d, The combination of the frames, A B, springs, S, V-shaped springs, E, and straps and buckles, F G, as and for the purposes described.

71,015.—GOVERNOR FOR STEAM ENGINE.—Reuben K. Huntoon (assignor to himself and J. Augustus Lynch), Boston, Mass.

I claim the combination and arrangement of the close oil vessel, I, and the open head or partition, H, with the case, A, the propeller, its shaft, and driving gears, arranged within the vessel and case, substantially as described.

I also claim the combination as well as the arrangement of the arm, M, its shaft, N, wheel, U, chain, V, and weight, W, or the mechanical equivalent of such wheel, chain and weight, with the propeller, its shaft, and the case or cases containing such propeller and shaft.

I also claim the combination of the guide wheels, X X, or their equivalent, with the weight, W, its chain, V, and supporting wheel, U, the shaft, N, arm, M, the propellor, its shaft, oil reservoir or case, and operate mechanism, substantially as described.

I also claim the combination of the insulator, E, with the steam-valvecase, and the governor made and applied thereto, substantially as set forth.

71,016.—VALVE FOR STEAM ENGINE.—Archibald Hutton, St. Louis, Mo.

I claim the valve, A, when constructed with one or two port-openings, a3, and combined with the ports, a a1, a2, and the condenser passage, B, as described and set forth.

71,017.—SASH STOP.—Charles R. Jenkins, Philadelphia, Pa.

I claim the combination with a window sash of a set of metallic or inelastic rollers, D, applied to one side, and a set of soft rubber rollers, C, applied to the other side, as and for the purpose set forth.

71,018.—SASH SUPPORTER.—Charles Kane (assignor to himself and John Gribben), Alleghany City, Pa.

I claim the polygonal shaped elastic friction roller, C, in combination with the box, H, slots, G G, and screws, F F, arranged in the manner and for the purpose specified.

71,019.—ESCAPEMENT FOR TIME-PIECES.—Wm. C. Kellum, San Francisco, Cal.

I claim in combination with the escape wheel, O, the arrangement of the detent lever, H, springs, J and K, lock lever, n, and adjusting screw, I, substantially as and for the purpose set forth.

71,020.—SLITTING MACHINE.—John J. Kents, Newtown, Pa.

I claim the combination of a series of knives or cutters with a segmental hinged press frame, covered with leather, a bearing plate, stationery and movable guides, distance pieces and screw, when combined and arranged in the manner and for the purpose described and set forth.

71,021.—CAR WHEEL.—Chas. E. Kleinschmidt, Cleveland, O.

I claim the plates, B B, having flanges, c c2, on their outer and inner edges, the hub, b, having a bevelled periphery, the tire, D, having its inner surface also bevelled, and the rings, E E2, and the bolts, f f, all constructed, arranged and combined in the manner described and for the purpose set forth.

71,022.—TOILET TABLE.—F. Kopper, New York city.

I claim the combination of the hinged parts, B, bars, D, hinged legs, C, spring catch, E, and adjustable towel frame, F, constructed and adapted to be folded together, as herein set forth for the purpose specified.

71,023.—GRAIN BINDER.—Israel Lancaster, Baltimore, Md.

I claim, 1st, The combined action of the band carrier, 50, and wing, C, substantially as described, and for the purpose mentioned.

2d, The application to the band carrier, 50, to the chain, O, constructed and operated substantially as described and for the purpose mentioned.

3d, The method of holding the two ends of the cord forming the sheaf band, by means of pinching bars placed at a short distance from each other, between which bars the knot is formed, substantially as described.

4th, The plate 16, and the pinching bar mechanism operated by it, constructed and operating substantially as described and for the purpose mentioned.

5th, The adjusting lever, B, and slotted plate, w, acting in combination, constructed substantially as described, and for the purpose mentioned.

6th, The removing of friction from the spools, E, during the rapid movements of the lever, B, substantially as described, and to prevent breakage of the band material.

7th, The operation of the bar, 20, by cam segments on the shaft, 22, in the manner and for the purpose substantially as described.

8th, The construction and operation of the knife, 7 7", in the manner and for the purpose substantially as described.

9th, Preventing slack in the sheaf band on releasing the sheaf, by forming the folds of the knot over an arm which carries it to a straight line between the pinching bars, in the manner substantially as described.

71,024.—TASSEL FASTENING.—Charles P. Lang, Chicopee, Mass.

I claim, 1st, The cam fastening, a, when constructed as described, and for the purpose specified.

2d, The cam, a, in combination with the core-block, e, and cord, b, substantially as and for the purpose specified.

71,025.—SLEIGH KNEE.—Gunder Larson, Lake Mills, Wis.

I claim a cast iron sled knee, having separate supports, in one casting, as shown and described, and for the purpose specified.

71,026.—HOSE GUARD.—David P. Lewis, Huntsville, Ala.

I claim a guard for hose or tubing, made substantially as described, for the purpose specified.

71,027.—PAINTERS' WINDOW-JACK.—S. P. Loomis, Philadelphia, Pa.

I claim the improved window jack, constructed and arranged substantially as and for the purpose herein shown and described.

71,028.—APPARATUS FOR CHARGING SODA WATER.—John D. Lynde, Philadelphia, Pa.

I claim, 1st, Constructing the acid-chamber, K, in such form that when combined with the body of the generator, and charged for use, and tilted back, the acid in the chamber will recede or flow back from the valve, substantially as set forth.

2d, Supplying strainers to the inside of acid chambers or gas generators for the purpose described.

3d, The application of enamel or porcelain lining to the alkali chamber or body of gas generators.

4th, The application of the rockers, F2, to gas generators, as described.

5th, Tilting gas generator for the purpose set forth.

6th, Providing gas generators, or fountains, constructed of cast iron, with the braces, o o, to strengthen the flange, substantially as described.

71,029.—CHURN.—Romualdus Mahr, New York city.

I claim the arrangement of the driving wheel, H, pulleys, L and M, belt, g, double crank shaft, K, connecting rods, f f, and sleeve rods, E E, for working the reciprocating dashers, the whole constructed and operating substantially as described and specified.

71,030.—FIRE ESCAPE.—John Marx, Rochester, N. Y.

I claim the arrangement with the flexible tube, A, of the cord, a, sharp-pointed hooks, c, and the flap, B, operating in the manner and for the purpose herein set forth.

71,031.—WINDOW BLIND FASTENING.—Benson Mayo, Chatham, Mass.

I claim the combination of the spur, a, the latch springs, b b', the guard, e, the bracket rest, d, and the window blind, A, arranged and operating substantially as and for the purpose herein described.

71,032.—CONSTRUCTION OF SHEET METAL COAL HODS.—John McCoy (assignor to himself and Wm. T. Snell), Philadelphia, Pa.

I claim manufacturing sheet metal coal hods, by making the foot, C D, and the upper part, A, of the body, of plain sheet iron, and the bottom, E, and the lower part, B, of the body, of galvanized or zinced sheet iron, substantially as and for the purpose described.

71,033.—HOOP SKIRT.—John McKeever, New York city.

I claim a woven skirt, a portion of which is made of single close texture, and a portion of open guaze net work, the pockets being made of double close texture, as a new article of manufacture.

71,034.—FLOOR CLOTH AND CARPETING.—John B. Meldrum, Paterson, N. J.

I claim a jute floor cloth, or carpet printed with aniline colors, substantially as and for the purpose described.

71,035.—HAND LOOM.—A. Meredith and P. P. Meredith, Maxintuckee, Ind.

We claim the cam plate, I, in combination with the three-pronged dog, b, the levers, h h, the springs, m m, and the shuttle-drivers, L L, constructed, arranged and operating substantially in the manner and for the purpose herein shown and described.

71,036.—APPARATUS FOR DYEING HAIR.—Charles Merritt, South Weymouth, Mass.

I claim as my invention the apparatus substantially as described, that is, as composed of the jointed curved levers, and the cone, sponge, and jaw, arranged together substantially as set forth.

71,037.—BRUSH HOLDER.—John Messinger, Springfield, Vt.

I claim, 1st, The socket, C, in which the handle, D, is fitted, when secured to the clamp of a scrub brush, as shown, or in an equivalent way, to admit of the socket or handle being adjusted in different positions relatively with the brush, as herein set forth.

2d, The combination of the clamp, A, and socket, C, constructed substantially in the manner as and for the purpose specified.

71,038.—ELASTIC GUSSETS FOR WEARING APPAREL.—James Miller and James Miller, Jr., Peckham, Eng.

We claim elastic gussets or springs, formed by stitching through two fabrics several rows in parallel lines, and inserting between the same India rubber thread or cord, in one continuous length, substantially as herein described and for the purposes specified.

71,039.—KNITTING MACHINE NEEDLE.—Job Miller, Warren, R. I.

I claim a knitting machine needle, constructed of sheet metal, and formed as described, in combination with a stitch caster, constructed as described, to fit said needle, as and for the purpose set forth.

71,040.—DRAIN TILE MACHINE.—James W. Milroy, Galveston, Ind.

I claim the construction of a machine for molding tiles for drains by means of a table and treadles, d d, operating the roller, C, through slides, b b, working in grooved standards, a a, and the combination of the mold, E, with the roller in a machine as thus constructed, substantially in the manner and for the purpose as herein set forth.

91,041.—SPRING BUCKLE.—J. Ferguson Morsell, Stamford, Conn.

I claim, 1st, The combination of the bed plate, A, and spring, C, carrying a ridge or jaw, D, substantially as and for the purpose herein specified.

2d, The combination of a loop, E, with the bed plate, A, and spring, C D substantially as and for the purpose herein specified.

71,042.—MACHINE FOR MAKING BALL-CHAIN.—D. T. Munger, Waterbury, Conn.

I claim, 1st, The die E, combined with the dies, F F, so as to operate to close the ball upon the rivets, substantially as herein set forth.

2d, The arrangement of the plate, I, in combination with the dies, E and F F, as and for the purpose specified.

71,043.—HOISTING MACHINE.—Wm. Murray, Chicago, Ill.

I claim, 1st, The combination of the shaft, I, the disk, K, and bar, J, in a hoisting machine, when arranged and operating substantially as and for the purpose set forth.

2d, The combination of the platform, A, provided with the blocks, M, and frame, B, when constructed and operated substantially as described.

3d, In combination with the above, the pieces, N, for the purpose of keeping the platform horizontal, substantially as specified.

4th, I claim in combination with the platform, A, and racks, Q, the plates, O, rods, R, and levers, S, when arranged and operating substantially as and for the purposes herein set forth and described.

71,044.—COMBINED PUMP AND RESERVOIR.—Enoch Nickerson, Provincetown, Mass.

I claim a tank or reservoir, A, made air tight at its sides and top, and provided with a perforated bottom, in combination with a pump, D, as and for the purpose specified.

71,045.—FOLDING CHAIR.—J. Nicolai, Boston, Mass.

I claim the combination of the legs, A and B, pivoted at H, the handles, D, and C', the seat hinged at the rear end, and supported in front upon the rung, M, substantially as described and for the purpose set forth.

71,046.—LEVER FOR RAILROAD CARS.—Jay Noble, Rochester, N. Y.

I claim the lever, 1, jack 2, and fulcra, 3 and 4, constructed and arranged as and for the purposes mentioned and set forth.

71,047.—SHOW STAND.—John G. Oonk, Owensville, Ohio.

I claim a show stand constructed substantially as and for the purpose described.

71,048.—MACHINE FOR CUTTING PASTEBOARD, ETC.—Samuel Orth, Philadelphia, Pa.

I claim the shafts, D and E, with their adjustable disks, m and n, in combination with the shaft, F, and its adjustable disks, q, and the roller, D, the whole being constructed and arranged for the simultaneous cutting and scoring of straw and other boards substantially as set forth.

71,049.—STAIRS.—Wm. W. Page, Troy, N. Y.

I claim the combination of two or more parallel flights or sections in one staircase, or ascent of steps, assigning a separate flight to each foot, substantially in the manner and for the purposes set forth.

71,050.—APPARATUS FOR RAISING FLUIDS.—James Parker, Camberwell, Great Britain, assignor to W. W. W. Wood and R. H. Lamsen.

I claim the combination of the steam pipe, A, and its perforations, and the pipe, B, and its nozzles, b, with the tanks, C, their valves, D, or their equivalents, and pipe, E, for the purpose specified.

71,051.—LABEL HOLDER FOR RAILROAD CAR.—John H. Parsons, Quincy, Mich.

I claim the arrangement of the label rack, B, lid, A, with the coil spring, m z, substantially as and for the purpose described and set forth.

71,052.—BELT TIGHTENER.—Marquis Peatt, Dexter, Mich.

I claim the convex half-clasp, B, and the concave half-clasp, A, and the buckle, E, in conjunction with the strap, I, and the winch, G, arranged as and for the purposes described.

71,053.—GANG PLOW.—Horace L. Perry, Aurora, N. Y.

I claim, 1st, In a gang plow having a main frame, A, and a plow frame, C, substantially as herein described, hinging the main frame, A, at one side up on the axle, so that it may be levelled in the manner and for the purpose set forth.

2d, The rib or flange, O, formed upon the supporting wheels, substantially as and for purpose set forth.

71,054.—BRAKE FOR VEHICLES.—Cyrus Phelon, West Granville, Mass.

I claim a brake for vehicles in which the brake bar, B, having the shoes, H, arranged behind the wheels upon the body of the vehicle, is connected with the lower end of a lever, A, pivoted through the pole, the other end of said lever being operated by the holding back of the animals, the whole being arranged substantially as shown.

71,055.—QUARTZ MILL.—Loring Pickering and Chauncey St. John, New York city.

We claim, 1st, In a quartz mill the pan, A, having an annular trough, the mullers, B, propelled by arms, C, having fans, 3, and agitators, F, constructed and operating substantially as described.

2d, The jacket, D, and cone, J, when arranged with the cylinder, E, and used in combination with the parts of the above-described quartz mill, substantially in the manner and for the purpose specified.

71,056.—ROCK-DRILLING MACHINE.—Walter Pierce, Onion Valley, Cal.

I claim, 1st, The adjustable ways, C, having the drill, D, and the slotted hammer, F, moving upon them, substantially as and for the purpose described.

2d, The levers, J I and G, operating upon each other and upon the hammer, F, substantially as and for the purpose described.

3d, In connection, as an improved drilling machine, the levers, J I and G, the hammer, F, operating upon the drill, D, together with the adjustable ways, C C, the whole constructed substantially as and for the purposes herein described.

71,057.—ROLLER WHEEL FOR PLOWS.—Leman B. Pitcher, Salina, N. Y.

I claim, 1st, The segment frames, B B, and the cups, C C, when applied to a roller wheel for plows and cultivators, each separately and in combination with each other, substantially as and for the purposes described.

2d, I also claim the same parts, in combination with the roller wheel, A, operated upon the shafts, a a, substantially as and for the purposes described.

71,058.—APPARATUS FOR PRINTING TIN FOIL.—John Polhemus, Jersey City, N. J., and Christian H. Lilienthal (assignors to C. H. Lilienthal), Yonkers, N. Y.

We claim, 1st, In combination with a continuous sheet of tin foil and shell, J, the intermittent shear cutter, P, or equivalent therefor, operating as herein before set forth, and for the purposes described.

2d, We also claim, in a printing press for printing on a continuous sheet of tin foil, the combination of the intermittent shear cutter with the series of rollers, U, and bands, T, for the purposes herein before set forth.

71,059.—HORSE BLOCK AND HITCHING POST.—Geo. W. Preston, Corning, N. Y.

I claim, 1st, The combined horse block and hitching post, substantially as above set forth and described.

2d, The said combined horse block and hitching post, in combination with the hand rail, C, substantially as described.

3d, The said combined horse block and hitching post, in combination with the scraper, E, substantially as described.

71,060.—BELLOWS.—C. W. English, Cincinnati, Ohio.

I claim a bellows having a pipe with a tapering or flaring butt, B1 and shoulder or collar, B2, applied and operating in the manner and for the purpose set forth.

71,061.—CHILDREN'S CARRIAGE.—Horace H. Prindle and John W. Prindle, Sandusky, Ohio.

We claim, 1st, Attaching the body of the carriage to the running gear by means of joints, one of which is adjustable, and so applied that the carriage can be converted into a cradle, substantially as described.

2d, The combination of the spring, f, or its equivalent, with an adjustable joint, a', and front joint, i, substantially as and for the purposes described.

71,062.—SHAPING DIES OF GROOVED ROLLS.—Abraham Reese, Pittsburgh, Pa.

I claim the die, formed by the face of the roll, a, the collar, i, and the spring collar, d, substantially as and for the purposes hereinbefore described.

71,063.—RAILWAY CHAIR AND SLEEPER.—Leonard Repsher, Camden, N. J.

I claim, 1st, The combined sleeper and chair, consisting of the coupling bar, B, and clamps, D D, the whole being constructed and arranged substantially as and for the purpose herein set forth.

2d, The recesses, i, in the coupling bar, B, for the purpose set forth.

71,064.—NAIL-PLATE HOLDER.—J. C. Rhodes, South Abington, Mass.

I claim for employment, in a nail or tack machine, the combination of plate holder and nose piece, when constructed and arranged to operate substantially as described.

71,065.—CHURN DASHER.—R. W. Robinson, Clinton, Ill.

I claim a churn dasher having floats, with the planes of their blades set parallel with the axis of the spindle, A, and obliquely to the planes of a radius passing through their axes and through the axis of the spindle, substantially as and for the purpose set forth.

71,066.—THILL COUPLING.—Silas Rogers, Stanfordville, N. Y.

I claim the thill coupling, constructed as described, consisting of the upward projecting hook, C, formed upon the clip, and the eye, E, upon the thill iron, D, fitting over said hook, when the outer side of said eye is provided with the packing, F, working against the outer side of the hook, as herein described for the purpose specified.

71,067.—CHAIR BOTTOM.—C. W. Royse, Peterborough, N. H.

I claim fastening or securing the overlapping ends of the strips of the net work of chair bottoms passed over and under the frame, by means of staples, as above set forth and described.

71,068.—BRANDING IRON.—Chas. Rundquist, Mankato, Minn.

I claim, 1st, The combination of the types having tapering shanks, I, and plates, H, the pins, J, side bars, E, end pieces, F, set screw, M, blocks, L, arms, C, and handle, B, all constructed as described, for the purpose specified.

2d, The types, constructed as described, provided with the back plates, H, and tapering shanks, I, secured in the holder by means of the transvers pins, J, and blocks, L, the latter secured in position between the types by means of the central curved arms, C, as herein shown and described.

71,069.—FRUIT SEEDER.—S. A. Russell, Huntington, Conn.

I claim the arrangement of a cutter, E, having its edge formed in the manner substantially as described, with the follower, a, and combined with the seat, D, so as to operate in the manner set forth.

71,070.—CORN PLANTER.—J. M. Sampson, Waynesville, Ill.

I claim the plungers, E, fitted in openings, c, in the posts or standards, D D, and provided with cells or openings, f, in combination with the openings, e, in the posts or standards, and the elastic plates, i, all arranged to operate in connection with the hoppers, K K, and coverers O, substantially in the manner as and for the purpose set forth.

71,071.—PRESS.—Ulrich Schegg, Nauvoo, Ill.

I claim, 1st, The combination and arrangement of the levers, F, the ratchets, E', and the weights, w, substantially in the manner and for the purpose set forth.

2d, The combination of the roller, E, the ratchets, E', and the tackle, H h, substantially in the manner and for the purpose set forth.

3d, The combination and arrangement of the follower, D, the cords, I, and the roller, F, substantially as described and set forth.

71,072.—ALLOY TO IMITATE SILVER.—Achille Schmitte and Hilaire André Levallois, Paris, France.

We claim, 1st, The new alloy, so called mock silver (minargent), composed of different metals, as described.

2d, Introducing in our so-called mock silver unalloyed tungsten, unalloyed aluminum, and a considerable proportion of nickel, the anti-affinity of which for aluminum is well known, and which we have made alloyable.

3d, And we claim not only the abovementioned typic proportions, but also any proportions which will answer the purposes.

71,073.—BURGLAR ALARM.—D. B. Skelly, Lockport N. Y.

I claim, 1st, The combination of the bell spring, C, the plate, E, the hook, r, and the pin, a, the springs, G and H, the hook, F, and the trigger, J, arranged and operating substantially as shown and described for the purposes set forth.

2d, The combination of the stud, O, the arm, P, the hook, P', and the hammer, N, arranged substantially as described for the purpose specified.

3d, The stud, L, in combination with the lamp, D, and plate, E, substantially as and for the purpose set forth.

4th, The combination of the springs, G and H, and the trigger, J, as and for the purposes described.

71,074.—MACHINE FOR CUTTING PAPER COLLARS.—David M. Smyth, Orange, N. J., assignor to O. P. Dorman, New York city.

I claim the combination of the two pairs of hinged shears for shaping the ends of paper collars, with the pair of shears for cutting off the collars from a strip or sheet of paper, and the feeding mechanism, or the equivalent thereof, substantially as described.

And I also claim the toothed wheel with its holding pawl, and connected with the sliding reciprocating frame by a spring arm, or equivalent, in combination with the holding clamp, substantially as and for the purpose described.

71,075.—BULLET MACHINE.—W. Spillman, Marion Station, Miss.

I claim, 1st, The combination and arrangement of the forming roller, C, the stationary die, D, and the eccentric, F, constructed and operating substantially as and for the purpose herein described.

2d, The shear knife, b, operated by the eccentric, F, combined with the catch, d, operated by the tappet, e, and the spring, g, as and for the purpose specified.

3d, The forming roller, C', combined with the rollers, G G', the bent lever, H, the cam, I, and the spring, a, constructed and operating substantially as and for the purpose set forth.

71,076.—ADJUSTABLE DIE FOR CUTTING PAPER COLLARS and other articles.—Charles Spofford (assignor to himself and Sam'l T. Lamb) Boston, Mass.

I claim the within-described adjustable die, constructed substantially as and for the purpose set forth.

71,077.—DAMPER.—J. F. Stafford, North Granville, N. Y.

I claim the damper, B, suspended upon a pivot, a, and weighted at E so as to assume a vertical position by gravity, and employed in connection with the elevating and sustaining apparatus, D F G H I J, as and for the purpose set forth.

71,078.—ATTACHING THILLS TO CARRIAGES.—Wm. Starkey, Bridgeport, assignor to himself and E. L. Reeves. Paulsboro, N. J.

I claim the block, B, with its projections, d d, their openings, e e, and recess, c, in combination with the bar, A, and its pins, b, the whole being constructed, arranged, and operating as described.

71,079.—SHRINKING AND PUNCHING MACHINE.—C. V. Statler, Woodhull, Ill.

I claim, 1st, The bar, B, the gripe blocks, D and E, with their levers, k k', the kink block, G, and the eccentric lever, J, when the same are constructed, arranged, and combined, substantially as shown and described and for the purposes set forth.

2d, In combination with the upsetting device set forth in the preceding claim, I claim the arrangement, as described, of the punch and punch block, C.

71,080.—DROP PRESS.—Norman C. Stiles, Meriden, Conn., and John S. Miller, Springfield, Mass., assignors to Norman C. Stiles.

We claim, 1st, The endless belt, D, of leather, or analogous material of uniform character, in combination with the hammer, E, and with the wedge, G, or its equivalent, for directly connecting and disconnecting the hammer, the whole being combined and arranged substantially as and for the purposes herein set forth.

2d, The tripper, I', and suspending stop, J, mounted together on the movable block, I, so that both the tripper and the stop may be adjusted at the various hights required by a single operation, substantially as and for the purpose herein specified.

3d, The provision for dropping the hammer at will at any desired lower point than the tripper, I', the same consisting of the piece, L, standing always parallel with the motion of the hammer, and moved against the wedge, G, or its equivalent, at the desired moment, irrespective of the elevation of the hammer at that moment, substantially as and for the purpose herein set forth.

4th, The weighted stem, R, or its equivalent, operating as specified, in combination with the wedge, G, or equivalent device, operated by the said stem, and with the hammer, E, and belt, D, causing the hammer to be firmly connected to the belt by the act of striking on the object below, so that when the object struck is high, the belt will be seized at a corresponding level, and as the object is hammered down or turned over, so as to cover the upper surface, the belt will be seized at a corresponding lower level, all substantially as and for the purpose herein set forth.

5th, The adjustable front piece, A3, in combination with the guides, A1 A2, having grooves of the form specified, and with the holding means, A4, and adjusting means, A5, all arranged for joint operation, in connection with the hammer, E, or its equivalent, substantially as and for the purposes herein specified.

71,081.—DOOR AND GRATE SPRING.—Enos Stimson, Montpelier, Vt.

I claim, 1st, The springs, D, and rock shaft, C, in combination with the slotted main castings, B, substantially as described, in combination with the clasps, F, in manner and for the purposes substantially as herein shown and described.

2d, The loose pulleys, E, in combination with the springs, D, and rock shaft C, substantially as herein shown and described.

3d, The stop, g, in combination with the main castings, B, and rock shafts, C, substantially as herein set forth and described.

71,082.—MODE OF CHURNING BUTTER.—Jacob Strobeck, Parishville, N. Y.

I claim the construction and application of the scraper, H, the arrangement of the breakers, i i i i, with the means of adjustment and form of the dasher blades and mode of attachment to the shaft, F, in combination, as shown and described.

71,083.—GATE SPRING.—W. W. Sutliff, Town Line, Pa.

I claim the flat curved spring, a, hinged to the gate, A, and secured at one

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end in the notched block, b, arranged and operating as and for the purpose specified.

71,084.—WRITING APPARATUS FOR THE BLIND.—John Synnott, San Francisco, Cal.

I claim, 1st, The tablet with pins, b b, and the hinged frame, B, with notches or slots, a a, substantially as described for the purpose set forth.

2d, The bars, E F, and the measuring block, H, with the pin, I, together with the following block, G, with its projections, c, and lug, d, substantially as and for the purposes described.

71,085.—BRONZING MACHINE.—J. F. Tapley, Springfield, Mass.

I claim, 1st, In combination with a drum for carrying the paper, one or more reciprocating pads or brushes for spreading the bronze or color.

2d, Arranging a revolving brush within the feed box for the purpose of feeding the bronze on the sheet through openings in the bottom of the box.

3d, The feed box, C, with revolving brush, having the roll, G, operated by the cam, E, upon the cylinder or drum, A, arranged as described.

4th, The gate, K, operated by the cam, E, upon the drum, A, as and for the purpose described.

5th, The springs, o, in combination with the reciprocating pads, a a, etc., as and for the purpose described.

71,086.—MACHINE FOR DIGGING POST HOLES.—J. Thompson and B. B. Herrick, Edgewood, Ill.

We claim, 1st, The shovel, U, hung to roller, V, by means of levers, W, and operated by means of lever, Z, rod, X, and crank, y, for the purpose of catching the dirt drawn out by auger, E, substantially as herein specified.

2d, The combination of the standards, B, having a slot, L, with sash. C, shovel, U, and auger, E, arranged and operating as herein described.

3d, The combination of the capstan, N, pawl, T, sash, C, standards, B. shovel E, levers, W Z, rod, X, and crank, y, substantially as and for the purpose set forth.

71,087.—HAND LOOM.—T. Henry Tibbles (assignor to himself and F. L. McHenry), Kansas City, Mo.

I claim, 1st, The single upright picker staff, a, the sliding weight, g, and the straps, b and h. in combination with the lay, C, the breast beam, D, and the drivers, d d, constructed, arranged, and operating substantially as and for the purpose described.

2d, The cam rollers, k k, operated by the bent lever, q, as described, in combination with the heddles B, and the lay, C, operating as and for the purpose herein specified.

71,088.—STUMP EXTRACTOR.—John Turner, Grand Haven, Mich.

I claim the combination of the frame, A, with the working beam, B, the levers, C C, hung upon the bearings, D D, the braces, E E, the links, F F, the double rack, G, the chains or ropes, H H, the blocks, I I, and the hook, K, all arranged substantially as described, for the purpose designed.

71,089.—CONFECTIONERY.—F. Walter, St. Louis, Mo.

I claim the egg, A, when combined and arranged with the ornaments, B B', and the magnifying glass, b, as described and set forth.

71,090.—WASHING ACHINE.—Horace Warner, Lake City, Minn.

I claim the hanger driving-shaft, K, with arms, L, attached, the quadrangular sliding framework, E, with the spring catches, H, and pressure-spring, S, the improved manner of constructing ribs, c, and rollers, m, by cutting transverse notches upon their elevations. and the combination and arrangement of the whole for the uses and purposes herein specified.

71,091.—MACHINE FOR CUTTING AND FORMING WIRE.—J. Wasson, Elyria, Ohio.

I claim a machine for forming and cutting wire for tinners' and other purposes, constructed mainly of the guide marked, B, the rollers, E, the gearing, D, the shaft, D', the knife, C, and the stand, G, or their equivalents, arranged substantially as described.

71,092.—FASTENING FOR CORSETS.—A. W. Webster, Ansonia, Conn.

I claim a corset-fastening, composed of the wire, A. attached to the busk by its own ends, substantially as described and for the purpose set forth,

71,093.—THRASHING MACHINE.—Stanton D. Warner, Richmond, Ill., assignor to himself, Jonathan S. Roberson, John Black, and E. B. Brewster.

I claim 1st, The adjustable plates, A A, of straight or curved shape, constructed as described, provided on their inner sides with graduated teeth of the described shape, and operated in a reciprocating or vibrating manner by means as described, or other equivalent means, substantially as herein set forth.

2d, The endless apron cylinder, G, provided with flat triangular prongs, L, L, for the purpose described, and operating in combination with the adjustable vibrating plates, A A, as described and specified.

3d, The notched flexible bars or rods, H H, attached to the rear end of and combined with the vibrating plates, A A, arranged and operating substantially as herein set forth.

4th, The wire jog sieve, N, or sieves, constructed and operating as described, in combination with the vibrating plates, A A.

71,094.—FOUNTAIN BRUSH.—Joseph B. Warren, South Danvers, assignor to Geo. B. Melcher, Salem, Mass.

I claim my improved fountain brush, having not only a duplex padded valve, as described, but two perforated bearing plates or seats thereto, and the valve, or a projection from it to turn on a center between such seats, and extend through an opening or slot in the side of the case substantially in manner and so as to operate as specified.

Also the brush fountain, as made not only with a socket to receive the brush in manner as described, but with the two valve seats, and a valve arranged between and so as to operate with them in manner substantially as explained.

71,095.—RUBBER SHOES.—J. Weidenman, Hartford, Conn.

I claim 1st, The bar, A, having a strap, a', formed upon its lower end, and attached at its upper end to the rear part of the rubber shoe, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the curved arms, B. with the bar, A, substantially as herein shown and described and for the purpose set forth.

71,096.—BROADCAST SEEDING MACHINE.—Augustus Weiman, West Union, Iowa.

I claim 1st, Providing the harrows, L M M, any or all of them, with cleaning bars, k N, arranged or applied in the manner substantially as and for the purpose set forth.

2d, The combination of the seed-box, D, with its perforated bottom and slide, E, adjustable bar, K, discharge board, J, and roller, C. all arranged substantially in the manner as and for the purpose set forth.

3d, The reciprocating knotted rope, I, or its equivalent, operated by the frame, G, from the roller, C, in combination with the adjustable bar, K, and the discharge board or plate, J, all arranged substantially as and for the purpose specified.

4th, The harrows, L M M, combined constructed, and applied to the machine substantially in the manner as and for the purpose set forth.

71,097.—HARVESTER.—Peleg Werni, Chicago, Ill.

I claim the combination and arrangement of an endless revolving sickle, L, sheaves, J K, gear wheels, G H, shafts, F B, wheels, C E, and chain, D, clutch, Z, arm, Y, and levers, V, operating in the manner and for the purpose set forth.

71,098.—HARVESTER RAKE.—Peleg Werni, Chicago, Ill.

I claim 1st, The plate or disk, A, in combination with the bars, B and C, and the arm, H, of the rake, when constructed and operating substantially as and for the purposes described.

2d, In combination with the arm, H, of the rake, the supporting arm, M, pivoted at h, about which point it has a vertical movement, carrying the rake in both the effective and non-effective stroke, substantially as and for the purpose set forth.

3d, The combination of the said rake arm, H, and swinging supporting arm M, pivoted as aforesaid, with the rollers, I J, and their connection, K, arranged in the manner set forth, and operating as described.

4th, The combination of the revolving plate, A, provided with projections, a b, the arms, B C, the rake arm, H, provided with a double joint, as described and the movable supporting arm, M, arranged and operating as and for the purposes specified.

71,099.—CORRUGATED IRON REVOLVING COAL SCREEN.—E. W. Weston, Providence, Pa.

I claim constructing a revolving iron coal screen with corrugated sides, substantially in the manner and for the purpose herein described.

71,100.—MACHINE FOR BENDING TIRES.—Dennis Wetzel, Springfield, Mo.

I claim 1st, The double rimmed wheel, B, and double rimmed, roller, E, disposed in frame, A, substantially as above set forth and described.

2d, The wheel, B, and roller, E, in combination with the spring, F, arranged and operating as and for the purposes substantially as above set forth and described.

71,101.—LUBRICATOR FOR CARRIAGE WHEEL BEARINGS.—W. P. White, Orland, Me.

I claim the wheel greasing or lubricating apparatus as described, that is as composed of the cylindrical cup, A, the cover, B, and the plunger, C, with their connection screws, c d, and discharge passage, b, or the same and the screw, a, the whole being arranged substantially as explained.

71,102.—CAR-BRAKE AND STARTER.—John Wiley, 2d, South Reading, Mass.

I claim 1st, The combination and arrangement of the toothed bar, S, arms, g1 g2 of the brake bar, G, toothed friction wheel, F, lever, O, connecting rods N, yokes, L, roller, M, frame, E, axle, D, and shaft, I, substantially as described for the purpose specified.

2d, The combination and arrangement of the treadle pin, V, treadle lever, U, sprin , X, roller, W, arms, g1, of brake-bar, G, toothed bar, S. and frame, E, substantially as described for the purpose specified.

3d, The combination of the draft bar, J, connecting strap, K, spring, H, brake bar and ratchets, G, with each other and with the frame, E, of the car substantially as herein shown and described and for the purpose set forth.

71,103.—PRINTING APPARATUS.—J. M. Wilbur, Cleveland, Ohio.

I claim 1st, The governor-device, k, constructed in the manner described to operate as and for the purpose set forth.

2d, The cylindrical ink holder, F, constructed in the manner described, to operate in the manner shown, as and for the purpose set forth.

3d, The driving mechanism, when regulated by the governor-device, k, constructed as described, and combined with a printing machine, substantially as and for the purpose set forth.

4th, The cylindrical removable stereotype, D, provided with the changeable dating-type, X, and permanent inscription, W, when used in combination with the automatic printing machine described, as and for the purpose set forth.

71,104.—STEREOTYPE CASTING.—J. M. Wilbur, Cleveland, Ohio.

I claim the stereotype-pan, A, provided with the ledges, a a, in combination with the plates, B B, constructed substantially as and for the purpose set forth.

71,105.—HAND STAMP.—J. M. Wilbur, Cleveland, Ohio.

I claim forming the printing surface, A, of a hand-stamp in the manner described and for the purpose set forth.

71,106.—SAFETY ATTACHMENT FOR POCKETS.—Edward Williams, New York city.

I claim the safety-attachment for watch pockets herein described, the same consisting of the holder, B, having two jaws, F and G, the one swinging upon a hinge joint and held in proper position by a spring, and the other moving in a sleeve in part, D, and actuated by a spiral spring, the whole arranged and combined to operate substantially as specified and for the purpose set forth.

71,107.—MEANS FOR SECURING AND RELEASING HORSES.—Charles Wills, New York city.

I claim the spring-bolt, A, in combination with wire, B, pitch-chain, B1, plate, F, ring, B2, angle-piece, G, and knob, H, substantially as and for the purpose herein specified.

71,108.—PAPER-MAKING MACHINE.—Edwin Wilmot, Laona, N. Y.

I claim 1st, The employment of two or more rubber rollers, in combination with the endless apron, C, substantially as and for the purpose set forth.

2d, The rubber rollers, F F, in combination with the metallic or wooden roller, I, for the purpose of giving additional pressure to the paper, substantially as and for the purpose set forth.

3d, The employment of the rollers, H H' and L, substantially as and for purpose described,

4th, In combination therewith, I claim the rubber rollers, F F, and metallic or wooden roller, I, substantially as and for the purpose set forth.

71,109.—BOILER CLEANER.—G. W. Wiswell, Pilot Knob, Mo.

I claim the construction and arrangement of the pipe, B, with reference to its tapering dimensions, and its flattened end, b2, when applied to the boiler, A, as described and shown.

71,110.—BURGLAR-PROOF SAFE.—Linus Yale, Jr. Shelburne Falls, Mass.

I claim making an open space between the edges of the door and the door frame, substantially as and for the purpose specified.

71,111.—SNOW-PLOW.—J. S. Zane, Pleasant Plains, Ill.

I claim 1st, The double mold board, D, hinged at the upper end of the inclined planes, A A, to be raised and lowered as and for the purpose herein described.

2d, The arrangement of the inclined planes, A A, forming a ridge in the middle, the vertical cutters, s s, and the movable cutter, p, substantially as described,

71,112.—LAMP EXTINGUISHER.—C. E. Abbot, Malden, Mass.

I claim 1st, The arrangement for conjoint operation, of the tongue, t, and finger, m, as and for the purpose set forth.

2d, The spring, s, in combination with the pin, i, and lever, h, arranged and operating as specified.

3d, The stop-notch, n, on lever, h, operating as and for the purpose described.

71,113.—COTTON AND HAY-PRESS.—B. B, Alfred, La Grange, Ga.

I claim 1st, The combination of the slotted levers, L L, with the box, D, blocks, e e, and follower, F, substantially as and for the purposes specified.

2d, The combination of the parts referred to in the foregoing claim, with the double acting compound screw, C C', substantially as and for the purposes set forth.

71,114.—APPARATUS FOR RAISING AND LOWERING WINDOW-BLINDS AND CURTAINS.—Geo. Allix, St. Helier's, Island of Jersey.

I claim 1st, The combination of the slit, guide, and chain, arranged with reference to each other and a window blind. curtain, etc., so as to operate substantially in the manner set forth, the combination being substantially such as described.

2d, The combination of the slit, guide and chain with the lever. which, when lifted moves the chain out of the slit, the combination being substantially such as herein set forth.

71,115.—DINNER PLATE.—J. K. Andrews, Ant m, Ohio.

I claim a plate provided with partitions in the center and with a rim in the usual form, for the purposes set forth.

71,116.—BUCKLE.—J. K. Andrews, Antrim, Ohio.

I claim the plate, A, formed substantially in the manner herein represented, for the purpose of confining together straps without stitching or riveting, as herein fully set forth.

71,117.—MALT HOUSE OR KILN.—Wm. Appleton, Albany, N. Y.

I claim 1st, The induction of a current or currents of air over the malt floor. by means of draft pipes or tubes, G, connecting said floor or chamber with the heating-chamber of the kiln and in drying the malt substantially as and for the purposes specified.

2d, The combination of the flue, S, with the flue, G, to the malt floor, C, and heating chamber, F, for operation together as herein set forth.

3d. The flue, N, in combination with the heating chamber, F, malt floor, C, and flues, G and S, for action in concert as specified.

71,118.—CARRIAGE SPRING.—J. B. Ashley, (assignor to himself and J. A. Brownell), New Bedford, Mass.

I claim the spring, C2, and linking plate, E2, and clip-iron, D2, in combination with the packing, A1 A2, and bolts, B2 B2, all arranged and applied substantially as and for the purpose described.

71,119.—ARTIFICIAL FUEL.—J. E. Atwood. Trenton, N. J.

I claim artificial fuel composed of coal tar, coal dust, peat and lime, substantially as described.

71,120.—APPARATUS FOR MAKING STAMP-GILT PAPER HANGINGS.—William Bailey, New York city.

I claim 1st, The combination of the rotating impression cylinder, the rotating pattern cylinder, and the heating apparatus, or the equivalent thereof, as specified, for supplying the pattern cylinder with heat.

2d, The combination of the rotating impression cylinder and the rotating pattern cylinder with the devices, or the equivalent thereof, substantially as described for securing and adjusting the pattern plates on the pattern cylinder.

3d, The combination with the impression and pattern cylinders of a registering belt, constructed and used substantially as and for the purposes herein specified.

4th, The special devices herein described, for securing the pattern plates to the cylinder.

71,121.—PISTON PACKING FOR STEAM ENGINE.—James Barwick, and Samuel Tindall, Silvertown, Eng., assignors to themselves and Chas. T. De Forest, Stamford, Conn.

We claim the application and use, for the purposes hereinbefore described, of hard india-rubber or its equivalent, mixed with oil or grease, substantially as herein set forth.

71,122.—PUMP.—John Bean, Hudson, Mich.

I claim the pump constructed with the cylinder, D, formed of staves held together by india-rubber bands, and the tube, E, in the chamber of the pump stock, and with the diaphragm, G, and the rod, B, as and for the purposes herein set forth.

71,123.—LATCH FOR CARRIAGE DOOR.—Norbert Belvallette, Paris, France.

I claim a pendant handle or tassel, of any material, acting upon a carriage lock with a lever or other apparatus in place of the fixed handles at present in use inside of carriages.

71,124.—METALLIC CAPSULES FOR BOTTLES.—Wm. Betts, Wharf Road, Eng.

I claim a metallic capsule, constructed for application to the neck of a bottle, as described and on which a trade mark or title is stamped or otherwise permanently imprinted, for the purpose specified.

71,125.—AXLE BOX.—William A. Boyden, Altoona, Pa.

I claim the two semicircular packing plates, C, constructed with rebated ends and furnished with springs, g, in combination with the annular washer, D, the journal, a, and the bearing, b, of the axle box, substantially as and for the purpose herein set forth.

71,126.—CARPENTERS' WORKBENCH.—James Bragdon, Boston, Mass.

I claim the combination of legs, c, and slotted and notched braces, f, when constructed, arranged, and operating substantially as specified.

71,127.—SPINDLE BOLSTER.—John E. Brown (assignor to himself and John Q. Wright), Fitchburg, Mass.

I claim, 1st, So constructing a bolster spindle that the oil for lubricating the latter is automatically supplied at a point above the level of the oil in the bolster cup, substantially as described.

2d, Constructing the bobbin holder, D, with a chamber in its lower end for receiving the sleeve which is formed upon the oil cup, E, said holder being secured to the spinnle, A, so as to rotate with it, substantially as described.

3d, The spiral groove, c, formed in the chambered bobbin holder, D, in combination with the sleeve, b, formed on the oil cup, E, substantially as described.

4th, The outlets, d d, through a chambered bobbin holder, D, or the equivalent thereof, in combination with a device which allows oil to rise from cup, E, substantially as and for the purpose described.

71,128.—HOP VINE SUPPORT.—C. T. Bush, Rensselaerville, N. Y.

I claim, 1st, The cap, s, provided with one or more sockets, constructed substantially as and for the purpose set forth.

2d, The arrangement and combination of the short poles, p p p, caps, s s s, and branches, a a a, substantially as described.

71,129.—COAL STOVE.—William M. Bush and Thomas B. Richards, Cincinnati, Ohio.

We claim, 1st, The combination of the annular horizontal plate, H, and annular converging plate, B, forming a close flue for the admission of air with the chimney, C, substantially as shown.

2d, The concentrating flange or ring, E, in connection with the chimney, C, and plate, B, substantially as described.

71,130.—WOODEN BUILDING.—Joseph Busser, Troy, Ohio.

I claim the construction of the outer, or both the inner and outer, surfaces of the outer walls of wooden buildings and the walls themselves of planks shaped and arranged substantially as herein described as shown.

71,131.—SEWING MACHINE.—Caleb Cadwell, Waukegan, Ill.

I claim, 1st, The combination of the shaft, J, crank, W, and crooked connecting rod, R, the cam or projection, c, arms, a5 a7, and rod, a8, and the link, K, rod, M, and annular lever, said parts being arranged substantially as described and employed to operate the needle slide, thread tightener, and shuttle, as explained.

2d, The combination of he needle bar, T, collar, a, connecting rod, U, and arm, V, for operating the feeding foot, H1, substantially as described.

3d, The feeding attachment composed of the bent forked lever, V, the perpendicular bar, H2, operated by the short lever, s", and the spring, s'", the pivoted bar, o'", bearing the feeding foot, H1, the gage screw, Z', and the spring, x', all arranged and combined in their operation substantially as and for the purpose described.

4th, The ring, G', supported in the outer ring, D', in which its position is regulated by the clamping key, g", the thumb piece, g'", and the spring, e"; having the arm, H2, to support the upper ring, G", and the double arm, H3 H4, to guide the feed foot, H1, and bearing the feeding attachment. all constructed and arranged substantially as and for the purpose specified.

5th, A thread-tightener device consisting of the parts, a6 a7 a5 e c3 and Y, arranged and operating substantially as described,

6th, A shuttle constructed as herein described and having an internal tension device consisting of the parts, ax cx dx,

7th, The bracket, K, with its bearings, t u, in combination with pivoted lever, L', spring, l2, adjusting nut, v, and spool, constructed and arranged as herein described.

8th, The spring, x, applied to the spools, M1 M2, in the manner and for the purpose specified.

9th, The bobbin or spool winder, n', with the shaft, z, pulley, a', adjustable bearings, y y', hinged at b', and spring, c', when constructed and operating as herein described.

71,132.—HARNESS ROSETTE.—G. S. Caldwell, Syracuse, N. Y.

I claim a glass rosette, A, provided with an ornamental lining or backing, c c, and secured to the plate, B, from the button, D. substantially in the manner and for the purpose set forth.

71,133.—TRANSPLANTER FOR GARDER USE.—Hiram Carmichael, Rochester, N. Y.

I claim as an improvement in transplanter making the two blades, B, detachable by means of the screw joint, substantially in the manner shown and described, whereby either blade may be used as a garden trowel.

71,134.—COMBINED PLANTER AND CULTIVATOR.—Isaac H. Chappell, Decatur, Ill.

I claim, 1st, The wide tires, R R, when attached substantially as described, for the purpose specified.

2d, The links and hooks, B B, with the connecting rods, C C, and steadying bar, D, arranged substantially as described for the purpose designed.

3d, The crotched stakes, E, and levers, F, arranged substantially as set forth for the purpose specified.

4th, The slotted bar, G, and lever, H, for the purpose designed.

5th, The combination of the cultivator and planter when built substantially as hereinbefore set forth and for the purposes specified.

71,135.—BLIND FASTENING.—Edward A. Chavantre, Newark, N. J., assignor to Alfred Chavantre, New York city.

I claim the bolt, n, taking the notches of the hub of the hinge in combination with the latch bar, r, jointed to the shank, m, of said bolt, n, as and for the purposes set forth.

71,136.—GARMENT SUPPORTER.—H. M. Clemence, Worcester, Mass.

I claim the movable metal arms, B and C, in connection with the hanger, A, and thumb screw, D, by means of which the supporter is adjustable to garments of any size,

71,137.—HORSE HAY FORK.—Abraham Coates, Watertown, N. Y.

I claim, 1st, In hay forks such as described the combination of a center bar wedge shaped or provided with inclined sides as specified with claws or barbs pivoted to the sheath of the fork and provided with correspondingly inclined or bevelled ends under such an arrangement that when the said claws are projected from the sheath the inclined sides of the center bar will be held between the said ends of the claws, in the manner and for the purposes hereinbefore stated.

2d, The combination with the slotted center bar and wedges formed therein of the claws or barbs pivoted to sheath of the fork and constructed and arranged for operation as herein described.

3d, The combination with the center bar and claws and hinged connecting rod of the lever to the shorter arm of which said rod is pivoted and the detent or locking device, under the arrangement and for operation as herein shown and set forth.

4th, The combination with the lever for operating the center bar and claws of the detent or locking device and its spring under the arrangement specified so that both the said lever and the detent by which it is held in position may be actuated simultaneously and at one operation, as set forth.

71,138.—TOY HOOP.—John M. Crawford and Horace L. Hervey, Philadelphia, Pa.

We claim a toy hoop in which hoop, A, handle, D, wire, E, animal, G, and bells, I, are combined, substantially as and for the purposes set forth.

71,139.—BUILDING SCAFFOLD.—N. B. Crawford, Bennington, Vt,

I claim the scaffold poles, c, fitted to be extended in length as set forth in combination with the winch barrels, f, frames, m, and platform, n, as and for the purposes specified.

I also claim the platform, n, formed of sections hooked together, in the manner set forth.

71,140.—SCAFFOLD FOR ROOFS.—N. B. Crawford, Bennington, Vt.

I claim the platform, b, sustained on the skids, c c, in combination with the winch barrels, d, ropes, f, pulleys, g, and claws, i, as and for the purposes set forth.

And in combination therewith, I claim the ladder, h, applied as and for the purposes specified.

71,141.—FURNACE FOR SOLDERING.—Lewis Cutting, San Francisco, Cal.

I claim a soldering furnace having heaters, G G, provided with plates, H H, for utilizing the heat of the furnace substantially as described and in combination with the heaters provided with plates, H H.

I claim filling the center of the heater with gypsum, fire brick, or some slow conductor of heat.

I also claim, in combination with the heaters, G G, the top cover of the furnace formed of gypsum, fire brick, or other slow conductor of heat, substantially as described and for the purposes set forth.

71,142.—TOOTH POWDER BOTTLE.—J. B. Da Camarah, Jr., Newark, N. J.

I claim tube, C, substantially as and for the purpose specified.

71,143.—PAPER BAG.—George Dare and Diana Dare, Auburn, N. Y.

We claim the manner of folding a piece of paper upon each side of its center for the purpose of forming a bottom the superficial measurement of which shall be the same as the mouth of the bag, substantially for the purpose set forth.

71,144.—TUBE WELL.—T. J. Dean, St. Louis, Mo.

I claim a tube well its lower section consisting of two concentric perforated tubes one wire gauze tube surrounding the interior perforated tube and another lining the exterior perforated tube, a body of filtering material being placed between the two tubes of gauze, all substantially as shown and described.

71,145.—SELF-LUBRICATING GIB.—W. A. Devon, Port Richmond, N. Y.

I claim, 1st, A gib constructed in two parts, as shown by A B, and fastened as seen at a a, or their equivalents, substantially as herein set forth.

2d, The self-oiling device as shown in D and C, with the roller, d, and slot, t, and slides, c, the spring, g, in connection with the wick, b b b, or their equivalents, substantially as and for the purpose herein set forth.

71,146.—FENCE.—Benjamin K. Dorwart and George F. Rote, Jr., Lancaster, Pa.

We claim the braces, B B, pivoted at their upper ends to the blocks which connect the panels or to the posts, substantially as and for the purpose set forth.

71,147.—FENCE.—Benjamin K. Dorwart and George F. Rote, Jr., Lancaster, Pa.

We claim, 1st, The keys, E E, constructed as described and used with the braces, G, pins or wedges, a a, and panels, A B C D, as and for the purpose set forth.

2d, The swivel block, H, as constructed and used with the permanent post and panel, as and for the purpose set forth.

71,148.—NAIL PLATE FEEDING DEVICE.—Daniel Drawbaugh, Eberly's Mill, Pa.

I claim, 1st, The combination of the spring fingers on the vibrating yoke arm, E, and the spiral flanges upon the tubular bearing, c, through which the nail plate feeding rod passes, for the purpose and in the manner substantially as described.

2d, The combination of the tubular bearing, c, nail feeder, F, and universal joint, C5, arranged substantially as and for the purpose described.

3d, The combination of the loaded lever, k, arranged upon the outer end of the nail-feeding rod, F, with the cord, weight, and pulley for feeding the nail rod with the nail plate up to the cutters, substantially as and for the purposes described.

4th, The hooked plate, S', and spring, S, applied to the bracket, A', substantially as described.

5th, Providing for automatically stopping the rotary motion of the nail rod and at the same time releasing this rod from the hooked plate, S', by means substantially as described.

6th, The combination of brake rod, I, on lever, H, with a friction wheel on the shaft, i, of the pulley, J, substantially as described.

7th, The adjustable post, G b, in combination with the laterally adjustable bracket, A', substantially as described.

71,149.—BREECH-LOADING FIRE-ARM.—Julius Elson, Boston, Mass.

I claim, 1st, The lever, C, provided with the grooved nut, d, in combination with the projection, e, and the hinged screw rod, b, as and for the purpose set forth.

2d, The combination of the solid breech block, B, when constructed as described, the hinged barrel, A, the projection, E, and the hinged screw rod, b, as and for the purpose specified.

71,150.—HOLDER FOR LAMP AND GAS SHADES.—Charles W. Emerson, Hartford, Conn.

I claim a holder for lamp and gas shades formed with the ring, a, wires, b b, and spring ends e e, over which the ring, f, of the shade, g, is passed and held, as set forth.

71,151.—CARRIAGE TOP.—Sidney Emmones and Elnathan S. Simpson, Geneva, N. Y.

We claim one or more auxiliary bows hinged to the main bows, and arranged to operate substantially as described for the purpose set forth.

And in combination with the auxiliary bows we claim the T-plates to which they are hinged.

71,152.—ADJUSTABLE CULTIVATOR.—John W. Ernst, Heidelberg, Pa.

I claim the diamond-shaped cultivator jointed and adjusted as herein described when combined with the teeth, shovels and regulating clevis, for the purposes set forth.

71,153.—PROPELLER.—William Fields, Wilmington, Del.

I claim a propeller for vessels consisting of a wheel, F, having from three-fourths to seven-eighths of its circumference bucketed and the balance solid or boxed set in a casing of sheet iron covered by a wheel house in combination with a weighted driving wheel, D, working upon a crank axle, C, connected with propeller shafts, E E, by means of the links or arms, D D, constructed and arranged as above described and shown by the drawings.

71,154.—POCKET BOOK CLASP.—D. E. Fisk, Springfield, Mass.

I claim a wallet clasp consisting of the tongue, A, attached to the outside of the wallet and the eye, F, attached to the flap of the same, the parts being arranged to operate substantially as shown.

71,155.—GROUT CONDUCTOR.—W. S. Follensbee, Janesville, Wis.

I claim a grout conductor composed of sections connected as described and arranged to operate substantially as set forth.

71,156.—APPARATUS FOR DISTILLING.—Andre Foubert, New York city.

I claim the arrangement of the pipes and cocks as specified in combination with two stills, for the purposes and as set forth.

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71,157.—THREAD CUTTER.—W. L. Gallaudet, New York city.

I claim, 1st, The cutter in combination with the shield constructed in the manner set forth substantially as and for the purpose specified.

2d, So arranging the cutter with reference to the shield that it may be readily detached therefrom, substantially in the manner described.

71,158.—ELECTRIC SWITCH.—Samuel Gardiner, Jr., New York city.

I claim, 1, The shaft, A, and arm, E, constituting an electric switch held to to its bearing by a spring, C, to insure metallic connection, substantially as described.

2d, The cam collar, H, employed to withdraw the switch from its bearing in the act of rotation, as explained.

3d, The conducting plate, L, employed in combination with the rotary switch, A E, and cam collar, H, to impart a given number of impulses by a simple rotation of the switch, as set forth.

4th, The lighting key, M, in combination with the gas-turning device, A E C H L, for the purposes set forth.

5th, The combination of the indicating dial, J, and index, K, with the rotary switch, A E, as and for the purpose set forth.

71,159.—STEAM ENGINE.—Edwin Garfield, Hartford, Conn.

I claim the valve, b, in combination with the double exhaust passage, a a', and the steam exhaust part, d, substantially as and for the purpose described.

71,160.—REGULATOR FOR MOTIVE POWER.—James E. Gillespie, Boston, Mass.

I claim, 1st, The mode of operation whereby a compound action is given to the shield, T c, by means of the levers, K and M N, or their equivalents, thereby causing it to be replaced in its normal position by the action of the pawls, S S, without in any degree preventing it from being moved as usual by a governing device.

2d, The cam, H, and lever, K, or their equivalents, in combination with a power regulator, substantially as specified and for the purpose set forth.

71,161.—PORTABLE CANDLESTICK.—Charles P. Gorely, Boston, Mass.

I claim a support for a candle so constructed and applied as to clasp candles of varying diameters and capable of being lowered with the consumption of the candle as well as to inclose a very small portion and allow it to be nearly if not entirely consumed.

Also the peculiar construction of the duplex spring clamp composed of the jaws, a a and b b, and handles, c c, or any mechanical equivalents therefor, substantially as hereinbefore explained.

Also the portable candlestick as composed of the disk, f, socket, e, post, d, spring clamp before described and folding handle, g, the whole being combined and operating together substantially as hereinbefore described.

71,162.—TOY PISTOL.—John Hall (assignor to himself and Charles S. Locke), Watertown, Mass.

I claim the repeating toy pistol, made substantially as specified, viz.: with the magazine and barrel, the opening from one into the other, the spring and piston, and mechanism for retracting the piston and discharging it, the whole being arranged in manner and so as to operate substantially as described.

Also the combination and arrangement of the catch lever, f, the slider, h, the trigger, i, the spring, k, and the cam or inclined plane, m, the whole being as specified and for effecting the retraction of the piston, contraction of the spring, and the discharge of the piston, in manner as described.

Also the combination of the stop pin and the slot or groove, o, or their mechanical equivalent or equivalents, with the piston, its spring, the magazine, the barrel, and mechahism for effecting the retraction and discharge of the piston, in manner as specified.

71,163.—MACHINE FOR PRESSING PEAT, CLAY, ETC.—Ezra M. Hamilton, Minneapolis, Minn.

I claim the combination and arrangement of the pulverizing roller, D, stampers, N, operated by the tappets, Q, and shaft, H', with the shaft, G', and crank, S', working the lever, S, with spring, V, and block, V', to push the cakes of peat out of the molds, M', all for joint operation as herein described.

71,164.—HARVESTER.—David S. Harner Xenia, Ohio, assignor to himself and Whitely, Fassier, and Kelly, Springfield, Ohio.

I claim, 1st, The combination of the lever, k, and rake head, l, when said lever and rake head are both pivoted to the plate, i, or its equivalent and are capable of independent vertical movements, substantially as and for the purpose set forth.

2d, The combination of the pitman, m, pivoted lever, k, and curved guides, l l, as and for the purpose set forth.

3d, The braces, j j, arranged on either side of the rake head, I, as shown so as to prevent any lateral movement of said rake head upon its bearing on the joint bolt, g.

4th, The rake head, l, moving upon a pin, e, which is about in line with the axis of the crank shaft. Said rake head is between said pin and the main frame, as set forth.

5th, The adjusting bar, W, connected to the main frame and coupling arm or its equivalent, for the purpose of adjusting the angle of the cutters and the position of cutter bar and platform.

6th, The following instrumentalities, combined and arranged substantially as set forth, in a harvesting machine having a floating platform and two driving wheels, to wit, the sweep rake, I, pivoted lever, k, pitman, m, crank, n, and geared wheel, p, meshing with a driving pinion on the main pinion shaft between the two driving wheels.

7th, The spring latch, b, constructed so that the latch and spring are formed of one piece in combination with the rake head, l, and arch, a, substantially as and for the purpose set forth.

8th, The combination of the pivoted arm, k, plate, i, and guides, l l, connecting rod, m, and crank, n, or their equivalents, so that the mechanism which drives the rake shall be connected thereto, outside of the center upon which said rake moves, substantially as shown.

9th, The arrangement of the rake head, l, in relation to its center pin, e, to wit, on that side of said center pin which is toward the main frame and cutting apparatus so as to reduce the necessary length of the platform, as set forth.

10th, The loose or rolling joint between the coupling arm, S, and bracket, U, shown in Figs. 1 and 4, in connection with the curved drag bar, R, as and for the purpose set forth.

71,165.—CIDER PRESS.—John H. Harper, Pittsburg, Pa.

I claim the rubber-faced disks, G G, upon the lower platform of the frame, as set forth, and used in combination with the disks, D D, for the purposes set forth.

71,166.—SCREW NAILS.—Hayward A. Harvey, New York city.

I claim a screw nail, composed of a proper head, and a body surrounded by nicks, which are diagonal to the axis of the nail, and at their ends extend into other nicks, so as to constitute a continuous irregular spiral nicking around the body of the nail, the nail, as a whole, being substantially the same as hereinbefore described.

71,167.—HORSE HAY-FORK.—Isaac J. Hattabough, Santa Clara County, Cal.

I claim the slotted ring hinge, B' d, or its equivalent, and the claw-shaped teeth, c' c' c' c' c' c', in combination with the rake heads, C C, and levers, E E, all arranged and operating substantially as above set forth.

71,168.—LAMP SHADE.—E. K. Haynes, Hanover, N. H.

I claim a segmental lamp shade, supported upon a frame of wires, constructed substantially as above set forth.

71,169.—SPRING FOR BED.—E. S. Hayward, Roxbury, Mass.

I claim a spiral spring with the largest circumference at some point between the ends, substantially as and for the purpose described.

70,170.—MODE OF CLEANING WOOL.—Henry Hayward, Brooklyn, and John M. Pendleton, New Brighton, N. Y.

We claim, 1st, In connection with the within described method of destroying burrs and other vegetable fiber found mixed with wool, by means of acid, the employment of carbonate of soda or carbonate of potash, as a neutralizer for the acid in the yolk or grease on the surface of the wool, so as to form a salt in the substance of the woody fiber, and to agitate the mass by the gas liberated, substantially as herein specified.

2d, In connection with the destruction of the woody fiber in wool by chemical agents, as specified, the recovery of the partially saponified grease by treating it with caustic soda, and afterwards with salt or sulphate of soda, or both, and allowing it to rest, all substantially in the manner and for the purpose herein set forth.

71,171.—HOT AIR STOVE.—Thomas Henney, Dubuque, Iowa.

I claim, 1st, The chamber, C, arranged between the base, A, and top section, D, and provided with communications, E, F and F', in combination with the division, b, and a damper, c, substantially as and for the purposes described.

2d, The combination of the intermediate chamber, C, top chamber, D, single wall fire chamber, B, short pipes, E, F, and long pipes, a a, substantially in the manner and for the purpose described.

71,172.—CORN PLANTER.—J. Warren Hitchcock and James K. Deyo, Morrisville, N. Y.

We claim a corn planter having drill plows, B, coverers, C, sliding bars, F F and G G, springs, M, pins, Y Y, and hoisting apparatus, described, constructed and arranged substantially as herein specified.

71,173.—VENTILATING APPARATUS.—Leonard Hoszek, New York city.

I claim, 1st, The combination, with the vessel and revolving wheel, of the air chamber and entrance and exit pipes, all these parts being constructed and arranged as shown in Fig. 1, for joint operation.

2d, The revolving screw, arranged and operating as shown in Fig. II, for the purpose described.

3d, The combination, substantially as shown in Fig. III, of the oscillating cups and discharge pipes, for the purpose set forth.

4th, The combination, substantially as shown in Fig. IV, of the pipes, f g, with the vessels, a c, for the purpose described.

71,174.—PASTE.—Joseph E. Hoover, Philadelphia, Pa.

I claim a paste consisting of the within named ingredients, combined substantially as specified.

71,175.—HARVESTER.—James Howard and Edward Tenney Bousfield, Bedford, England.

We claim, 1st, The arrangement of the short shaft, a e, the former radial to the drive wheel, and the latter parallel to and in the same vertical plane with the former, both supported in one and the same frame, which moves about the main axle as a center, and both shafts carrying gears at their forward ends, by which the motion to drive the cutter is transmitted, as set forth.

2d, The arrangement of the rake and reel arms in the radial sockets of the same reel boss, so that they shall all revolve with the boss around a common center, and the rake have, in addition to that motion, another motion around its long shank, which is supported by and turns in as well as with said boss, by gears, one fixed and the other movable, as set forth.

3d, Giving a differential speed to the reels of reaping machines, in the manner and for the purpose above described.

71,176.—HEATING STOVE.—Maurice C. Hull, New York city.

I claim, 1st, The flue, g, around, or partially around, the outside of the fire chamber, substantially as set forth.

2d, The inclined plate, f, forming the top of the flue, g, for preventing the lodging of ashes or fuel, as set forth.

3d, I claim the pipes, i, applied in substantially the manner specified, to cause the products of combustion to ascend toward the top of the furnace or stove, and then descend toward the base, for the purpose specified.

4th, The flue, n, and pipes, i, in combination with the flue, g, as and for the urposes set forth.

5th, The inclined plate, f, through which the smoke flues pass, substantially as and for the purpose specified.

71,177.—POTATO DIGGER.—Wm. H. Hutchins, Lockport, Ill.

I claim the combination of the concave share or blade, d, and the prongs, b b, rigidly fixed thereto, and of the peculiar and particular shape shown, all constructed and arranged as and for the purposes set forth.

71,178.—CALIPERS OR DIVIDERS.—M. G. Imbach, Hartford, Conn.

I claim the fixed pivot, F, and movable shank, O, extending through the parts, D E, forming one leg of the calipers, when operating as described for the purpose specified.

71,179.—PLATFORM SCALE.—George W. Jackson, Wyalusing, Pa.

I claim, 1st, the use of the stirrups, g, and the stirrups, h, when performing the double purpose of affording bearings for the floor beams, k k, and the hooks or links, e, and of clasping the shafts, A, in connection with the plates, i, all arranged substantially as described, and for the purposes set forth.

2d, The slotted arms, m, on the ends of the floor timbers, F, when used in platform weighing scales, substantially as shown and described.

71,180.—BURGLAR ALARM.—E. C. C. Kellogg (assignor to himself and Theodore Hoyt), Hartford, Conn.

I claim the toggle brace, in combination with the arm, d, connected with the striking mechanism of a burglar alarm, substantially as and for the purpose herein set forth.

71,181.—COMPOUND TOOL FOR CUTTING, PUNCHING AND UPSETTING.—A. A. Kent, Lyons, Iowa.

I claim, 1st, The lever, H, as constructed, in combination with the arm, B', adjustable connecting bar, G, and lever, D, substantially as and for the purpose set forth.

2d, The combination of lever, I, plate, J, and wheel, W, with the lever, H, all constructed and arranged as and for the purposes specified.

3d, The combination of the standard, B, with bar, L, lever, D, connecting rod, G, lever, H, wheel, W, plate, J, and lever, I, all constructed and arranged substantially as herein specified.

71,182.—CHURN.—M. W. Kilgore, Baltimore, Md.

I claim, 1st, a churn, each and every feature of which being made of galvanized iron, substantially as described and for the purpose specified.

2d, Constructing the blades or paddles of the dasher with their edges serrated, substantially as described and for the purpose set forth.

2d, So arranging the pipe, B, entirely independent of the dasher, that a continuous current of air is fed to the cream, and introduced at a point which is near the bottom of the churn, substantially as described and for the purpose specified.

4th, The combination of the pipes, B and d d', when the same are arranged substantially as described.

71,183.—LEVER JACK.—T. J. Kindleberger, Eaton, Ohio.

I claim a lever jack consisting of the frame, A, having the rack bar, B, placed therein, and operated by means of the wheel, C, and the lever, D, when said parts are arranged to operate as herein shown and described.

71,184.—ATTACHING PICKS TO HANDLES.—Henry W. Knight, Columbus, Ohio.

I claim the combination of the blade, the handle, the overlapping straps, fastening bolt, and the wedge, when all these parts are constructed and arranged as described for the purposes set forth.

71,185.—CONSTRUCTION OF BUILDINGS.—Bernard Joachim La Mothe, New York city.

I claim, 1st, the blocks, c, applied at the intersections of the rods or tubes that form the frame of the structure, and having holes passing into or through them in different directions for the reception of the rods or tubes, substantially as set forth.

2d, The double fold at one edge of the plate, k, as at m, fig. 4, and the bent or turned edge, l, for receiving the edge of the next plate, and for connecting the plate with the rods or tubes of the structure, respectively, substantially as set forth.

3d, The sliding clamp, j, of sheet metal, with its edges foldod toward each other, in combination with the plates, i, folded over at their edges and receiving the clamp, j, substantially as set forth.

4th, I also claim the method, substantially as shown in fig. 5, of fitting the sides of window sashes and window casings.

71,186.—DEVICE FOR SUSPENDING AND DETACHING ARTICLES.—Wm. C. Lane, Greenpoint, N. Y.

I claim, 1st, A hooking-rod, or device, having a hook receiving socket, C, for the elevation of the hook to its place of suspension and clearance therefrom when suspended, substantially as specified.

2d, In combination with the hook receiving socket, C, the hook-detaching horn, E, both carried by a rod or handle, essentially as described.

3d, The combination with a hook suspending device of a hook keeper, F, substantially as specified.

4th, An instrument or device consisting of a hook receiving or carrying socket, hook detaching horn, and hook keeper, all formed of one and the same piece, and attached to a common stock or handle, essentially as herein set forth.

71,187.—WINDOW SHADE.—Philip Lindemeyer, Hoboken, N. J., and Louis Lindemeyer, New York city.

We claim, 1st, The within described method of producing window shades, by preparing the fabric as recited, printing with thick size, powerfully compressing the gold leaf, or other equivalent material thereon; afterwards varnishing, printing with color over the metal, and varnishing again, all substantially in the manner and for the purpose herein specified.

2d, Zincographic window shades, produced substantially as herein specified.

71,188.—ANIMAL TRAP.—Nathan M. Linton, Wilmington, O.

I claim the combination of the hinged door, C, with the parts, B, D, E, F, and G, as and for the purpose set forth.

71,189.—WATER PROOF FRICTION MATCHES.—L. T. Luther, Oak Grove, Pa.

I claim the varnishing of the igniting ends of the matches, and the saturation of their lower parts with the saturating mixture composed of the specified ingredients or their equivalents, substantially as described.

71,190.—APPARATUS FOR ILLUSTRATING WAVES.—Chester S. Lyman, New Haven, Conn.

I claim a combination of one or more flexible wires, D E, one or more series of cranks, e f, and mechanism for revolving such cranks synchronously, the whole being arranged and applied together, and to a board or its equivalent, substantially in manner and so as to operate as and for the purpose as specified.

Also, the arrangement and combination of the series of flexile wires, F, with one or more flexile wires, D E, one or more series of cranks, e f, and mechanism for revolving such cranks synchronously, the whole being applied substantially in manner and so as to operate as specified.

Also, the combination and arrangement of the pendulum or wire, r, with the flexile wire, D, and its series of cranks, arranged and applied in manner and to operate together substantially as hereinbefore explained.

Also, the arrangement and combination of horizontal and vertical lines going through the axes of the cranks, substantially as represented in the drawings, with the system of movable wires, or mechanism for producing the wave motion, as set forth.

Also, the combination and arrangement of the circle, p, with the system of movable wires, or mechanism for producing wave motion, as specified.

71,191.—PROCESS OF SCOURING AND CLEANSING WOOL AND WOOLEN FABRICS.—Osborne Macdaniel, New York city.

I claim, 1st, An improved process for scouring wool and woollen fabrics, and removing the oil therefrom, substantially as herein described.

2d, An apparatus, employing steam indirectly, for scouring and drying wool, combined with a still, substantially as and for the purpose herein described.

3d, Crushing the tag locks and lumps of dirt, when saturated with naphtha, preparatory to scouring the wool, substantially as and for the purpose described.

71,192.—SYSTEM OF MEASURING AND CUTTING OUT DRESSES.—John Malnight, Grass Lake, Mich.

I claim the within-described system of cutting dresses, as set forth.

71,193.—CARRIAGE WHEEL.—William H. Marshall, Sutton, assignor to himself and Hosea B. Spaulding, Merrimack, N. H.

I claim the double round tenons, c c, in combination with the mortises, f f, for the purposes as described and set forth.

71,194.—ATTACHING THILLS TO VEHICLES.—O. L. Mather, Wellsville, N. Y.

I claim the portion, B, provided with the concave bed, a, to the sides, c c, of which the central pin, b, is attached, and part, D, with the concavo-convex end fitting into the said concave bed, a, when all are constructed and arranged as herein set forth, for the purpose specified.

71,195.—GATE FASTENING.—George McCoy, Antioch, Cal.

I claim a gate fastening, having the bolt, a, operated by the lever, B, and spring, c, together with the securing lock, g, or its equivalent, constructed and operated substantially as and for the purpose described.

71,196.—INVALID AND FRACTURE BEDSTEAD.—Thomas McIlroy, New York city.

I claim, 1st, The rods, E E, cords or other connections, D D', and shafts, C C', when employed conjunctively as a means for elevating the patient above the bed, in the manner and for the purpose set forth.

2d, The sectional bed bottom, G G1 G2 G3, in combination with the segments, H H', cog wheels, I II, shafts, 12 13, pawls, l', notched bars, J J, and rod, J', all arranged and employed in the manner and for the purpose set forth.

3d, The device, M m m m, or any substantial equivalent thereof, to enable the employment of three or a plurality of extension weights, as and for the object set forth.

4th, The foot rest, L, provided with legs and braces, L1 L2, and adapted to be used as a table, as explained.

5th, The arms, K K', arranged so as to be detached from and united to each other, by mortise and tenon, and employed substantially as and for the purpose explained.

71,197.—ARTIFICIAL LEG.—Abner McOmber, Schenectady, N. Y.

I claim, 1st, In an artificial leg, having a ball and socket joint such as described and shown, the central eye bolt, D, arranged as shown, in combination with the pin, j, bar, e, flexible strap, m, rod, k, and spring, l, all substantially in the manner and for the purpose described.

2d, In an artificial leg, having a ball and socket joint such as described and shown, the arrangement of the bolt, D, strap, m, and rod, k, in recesses, g h h', which allow a lateral as well as a vertical articulation of the ankle, as herein described.

71,198.—HAY RAKER AND LOADER.—Gideon C. Mead, Guilford, N. Y.

I claim, 1st, The combination with the hinge piece, a, and spring, b, of the roller, c, substantially as and for the purpose specified.

2d, The combination with the slide, S, of the supplementary slide or piece, V, substantially as and for the purpose set forth.

3d, The combination with the rake heads, C, and guide, I, of the spring, J, substantially as and for the purpose described.

71,199.—SAFETY HATCH FOR WAREHOUSE.—Arthur D. Medlicott, Windsor Locks, Conn.

I claim the employment of the opening and closing rolling slat platform, d, in combination with the shafts, b, weights, g, bars, d, and platform, h, substantially as and for the purpose described.

71,200.—PRINTER'S GALLEY.—P. Gray Meek, Bellefonte, Pa.

I claim, 1st, A printer's galley, constructed with a slot at one end, and a notched plate at the other, in combination with a side stick having a T-shaped head and pawl, when the same is operated by means of spring, substantially as described.

2d, Securing the type in position by means of the side stick, D, when the same is operated by springs, substantially as and for the purposes specified.

3d, The combination of the T-shaped head, a, plate, F, having holes, e, and pins, f, substantially as and for the purpose specified.

4th, The bottom plate, A, having notches, g, in combination with the blade or pawl, b, arranged and working in a slot in the end of the side stick, D, substantially as described, and for the purpose specified.

71,201.—SNAP-HOOK.—Charles H. Miller, Buffalo, N. Y.

I claim hinging the snap tongue to the hook, in the manner substantially as herein described.

71,202.—CAR COUPLING.—George R. Moore, Lyons, Iowa.

I claim the diverging levers, or clasps, when held and operated by the arrangement of springs and catches, as and for the purpose set forth.

71,203.—CAR COUPLING.—George R. Moore, Lyons, Iowa.

I claim the double hooks, or self-tightening clamps or claws, constructed as described, and pivoted in such a manner as to gripe the pin by the draught of the cars.

71,204.—FLUTINA-MELODEON.—Joseph Müller and Frederick Kaiser, Philadelphia, Pa.

We claim, 1st, The musical instrument herein described, adapted to be played either as a melodeon or as an accordeon, substantially as described.

2d, Supplying fresh air to the continuous current of air in the instrument through the holes, j, in the front of the upper part of the double chamber, B, substantially as described.

3d, The construction of the body of the flutina-melodeon with a lid, L, closing on the upper bellows, and lid, K, closing the keyboard, forming one side, and the bottom board, l', of the bellows, I, automatically closing the opposite side, whereby the body of the instrument is closed on all sides, and forms a portable case, substantially as described.

4th, The treadle, P, the detachable cord, M, and folding-stand, N, when combined and adapted for the purpose, substantially as described.

71,205.—PHOTOGRAPHIC APPARTUS.—Octave Nicour, Paris, France.

I claim, 1st, The apparatus or instrument as a whole, for photographing purposes, substantially as specified.

2d, The combination of lenses, C C C' C', of equal focal distance, and forming part or one and the same apparatus, and serving, the one set for finding the focus and the other for the production of the picture upon the prepared glass sheet or plate, substantially as specified.

3d, The combination of the lenses, C C C' C', adjusting screw, D, tubes, B B', with their dark and light chambers, the one for holding the ground glass F, or its equivalent, for projection of the image, and the other provided with a slot or opening, c, for receiving the prepared glass sheet or plate, H, on which the picture is taken, essentially as herein set forth.

4th, In combination with the tubes, B B', and lenses as described, the adjusting screw, G.

5th, The combination with a photographing device, made up of tubes, lenses, and dark and light chambers, essentially as specified, of a box, I, constructed to hold the prepared glasses, sheets, or plates, and operating to insert the same in succession or at pleasure within the photographing chamber, and to receive the picture therefrom, without, during such transfer, exposure to the light, substantially as herein set forth, or in any other equivalent manner.

71,206.—ANIMAL TRAP.—Harrison Ogborn, Richmond, Ind.

I claim, 1st, The movable disk, G, operating in combination with the tilting bar, I, substantially as and for the purpose specified.

2d, In combination with the above, the pivoted platform, J, arm, K, connecting rod, L, lever, M, and door, F, arranged in relation to the apartments A and C, as and for the purposes explained.

3d, The retaining wires, P, substantially as and for the purposes described.

71,207.—WATER BOILER FOR COOKING STOVE.—Clement Olhaber (assignor to Woodrow, Mears & Co.), Cincinnati, Ohio.

I claim, 1st, The horizontally-flued reservoir, J, and extension plate, B, arranged, combined, and adapted to operate as set forth.

2d, The arrangement in a stove reservoir, of the bottom horizontal flue, K, communicating at the rear of the reservoir with a smoke-pipe collar, formed by the flanges, H and I, on the extension plate and reservoir respectively, as herein expleined.

71,208.—ROTARY ENGINE.—Frederick Ortlieb, Williamsburg, assignor to the Metropolitan Rotary Engine Company, N. Y.

I claim, 1st, The combination, with a rotating piston made up of radial slides, and occupying an eccentric position relatively to the outer case, of separate inner and outer steam cylinders or chambers, when the one of said cylinders serves to use the steam expansively from the other in such manner as that the radial slides, which form a piston or pistons, common to both, are acted upon by high pressure steam at a short leverage, and by the expanded steam at a longer leverage, and lateral pressure on the main shaft, reduced or counteracted by the live or high pressure and expanded steam conjointly, substantially as specified.

2d, The arrangement, relatively to the inner and outer steam cylinders or chambers and rotating piston, common to both, of the several inlets and outlets for, without extra mechanism, and by the action of the radial slides composing the piston, the admission of high pressure steam to the inner cylinder or cylinders and passage therefrom, after performance of its duty, to the outer cylinder or chamber, to work expansively in the latter on said piston, and in due course discharge therefrom, essentially as herein set forth.

3d, The arrangement, substantially as herein described of the revolving piston, with its radial slides, inner and outer steam cylinders, and exhaust port in the outer cylinder to the condenser, for preventing the high pressure cylinder and greater portion of the low pressure one from being cooled by the condenser, essentially as specified.

4th, The steam balance plates, I and O, or I' O', the one of them (O or O') being stationary and connected with the outer cylinder, and the other (I or I') rotating with the piston, and both serving to pack the edges of the radial slides, and to relieve the piston of friction, essentially as herein set forth.

5th, In combination with the steam balance plates, O O', the packing rings, P P1 P2 P3, and recesses, m p, communicating with the high and low pressure cylinders of the engine, substantially as described.

71,209.—HAMES FASTENER.—Alonzo Palmer, Hudson, Mich.

I claim the bars, AB and C, and spring, D, constructed and arranged to operate in the manner and for the purposes set forth.

71,210.—COMPOSITION FOR COATING WOOD, IRON, PAPER, ETC.—Antonio Pelletier, Washington, D. C.

I claim, 1st, The compound consisting of vegetable fiber, silicate of soda, and soapstone, substantially as described, and for the purposes set forth.

2d, The compound consisting of vegetable fiber, soapstone, silicate of soda or its equivalent, when made into sheets or coated on fibrous, porous, or solid substances, and treated with coal tar and steatite, substantially as described and for the purposes set forth.

3d, As a new article of manufacture, the composition substantially as herein described and for the uses and purposes set forth.

71,211.—POCKET CUTLERY.—F. B. Perry, Northampton, Mass.

I claim the making of a knife in which the cheeks or sides of the handle through which the rivet is placed which holds the blade are united together by means of a bar secured to them in the manner and at the same position as above described.

71,212.—BALANCE WHEEL.—Elijah S. Pierce, Hartford, Conn.

I claim an improved balance wheel in which the outer rim or wheel is separate from the hub or axis, upon which it can turn when disconnected, and to which it is attached by the devices herein described, or their mechanical equivalents, for the purpose herein set forth.

71,213.—EMBOSSING CLOTH.—James E. Pollard (assignor to the Elliott Felting Mills), Franklin, Mass.

I claim the above described improved process of embossing and metalizing cloth or other material, such consisting in the employment of the gum, oil, and paste, or their equivalents, with the embossing plate and metalizing material under circumstances and in the manner, substantially as specified.

71,214.—HOTEL ANNUNCIATOR.—H. B. Porter, Chicago, Ill.

I claim, 1st, The sliding plates, B, provided with the projections, n and n', in combination with the front plate, A, the standards, D, and the horizontal rods, r, all arranged as and to operate in the manner substantially as specified.

2d, The combination and arrangement of the pivoted catches, i, and the plates, B, as and for the purposes set forth.

3d, The arrangement of the levers, l, in relation to the trip, k, substantially as represented, and to operate the same in the manner specified.

71,215.—AIR-TIGHT JAR.—Geo. M. Ramsay, New York city.

I claim contracting the inlet of a jar at three or more portions of its cross diameter, so as to hold the lid near the center, substantially as and for the purpose herein set forth.

71,216.—GLASS MOLD.—J. H. Reighard (assignor to J. H. Hobbs, Brockunier & Co.), Wheeling, W. Va.

I claim, 1st, Cooling the molds used in the manufacture of glassware, by means of water introduced into a chamber within the walls of the mold, substantially as above set forth.

2d, The use of the reservoir, K, pipe, L, spring valve, m, and arm, n, in combination with the mold, G, having the chamber, H, substantially as described.

3d, The use of the above described apparatus in combination with the press plate, P, having the guides, o o, substantially as and for the purpose set forth.

71,217.—BRAND FOR MARKING ANIMALS.—Frank H. Richards, Troy, N. Y.

I claim the stock or frame consisting of the several parts, the plate, a, the rib, b, the arch, d, and the handle, h, combined and forming a single piece, the hooks, m m, at the backs of the letters, and the double wedge, n, the whole constructed substantially in the manner and for the purpose above described.

71,218.—AIR PUMP.—Edward S. Ritchie, Brookline, Mass.

I claim the combination as well as the arrangement of the lever, F, the rod q, and the stuffing box, p, with the valve, o, the piston, B, and the barrel, A. Also the application of the valve rod, q, to the valve, o, so as to be movable laterally relatively thereto, in manner substantially as and for the purpose described.

Also the combination and arrangement of the annular flap or auxiliary valve, w, with the valve, o, and its seat, k.

Also the combination of the prismatic guide, n, or its equivalent, with the valve, o, and the passage, l, and with the rod, q, applied to the valve, o, so as to be movable laterally therein, or with respect to it, as specified.

71,219.—TRUNK.—Samuel S. Ritter, Philadelphia, Pa.

I claim, 1st, As an article of manufacture, the trunk above described, having the end pieces, E E, clamped into the shape described and shown, and attached to the trunk by the rivets, r r, at a distance from the corners or angles of the trunk, so as to leave the latter perfectly smooth, substantially as and for the purpose specified.

2d, The process or method of constructing trunks, valises, etc., substantially as above described.

71,220.—BABY WALKER.—Joseph Rohr, Batesville, Ind.

I claim a baby walker having platform, A, standards, B and C, set screw, D, swinging bar, F, supporter, H, toy table, K, and ratchets and pawl, as de

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scribed, all constructed and arranged substantially as and for the purposes herein specified.

71,221.—LAMP EXTINGUISHER.—Fred. Rohrer, San Francisco, Cal.

I claim a lamp extinguisher constructed and arranged substantially as described, as a new article of manufacture.

71,222.—CONSTRUCTION OF CONDUCTOR PIPES.—John C. Rohrman, Philadelphia, Pa.

I claim a waste water pipe having a longitudinal recess or groove, a, made substantially as described, by bending, lapping, and soldering the edges of the plates of which the pipe is composed, for the purpose specified.

71,223.—TRUNK.—E. A. G. Roulstone, Roxbury, Mass.

I claim the employment of leather or equivalent flexible material, having its surfaoe formed into alternate parallel ribs and furrows, substantially as shown and described.

Also forming the metal corner of a bag or trunk frame, or molding, of separate pieces of angle metal, united as set forth.

Also attaching the strap to the trunk body by means of a loop, connected with and held by a fastening plate or projections within the trunk, substantially as set forth.

Also the manner of hanging the tray, substantially as shown and described.

71,224.—FIRE FENDER OR GUARD.—Charles H. S. Schultz, Cincinnati, Ohio.

I claim, 1st, The provision in a fire guard of the door or flap, B, as and for the purpose set forth.

2c, The arrangement of adjustable hooks, D, with the nuts, E, and clips, F, for the object explained.

71,225.—BED BOTTOM.—David A. Scott and Jonathan E. Burdge. Cincinnati, Ohio.

We claim passing the rods, E E, transversely through a series of longitudinal slats, a a, and under the arms, c c, of a like series of springs, for the purpose of securing the slats in their places, substantially and for the purpose set forth.

71,226.—CONSTRUCTION OF COAL SCUTTLES.—Joseph Scott, John Scott, and Wm. Miller, Brooklyn, N. Y.

We claim, 1st, A coal scuttle constructed as described, that is, by forming the joint between the body and bottom by flaring the bottom edge of the body outwardly, and turning or striking up a corresponding flange on the bottom plate, and then forming a bead with the two together, substantially as shown and described.

2d, In combination with the above joint, we claim the beaded upper edge of the base, C, for attachment in the manner specified.

3d, A coal scuttle constructed substaintially as described, whereby the body and base may be packed in separate nests, to be connected at pleasure, as and for the purposes set forth.

71,227.—CROSS-CUT SAW.—Alfred M. Seabury, Johnstown, assignor to Charles W. Du Bois, Brooklyn, N. Y.

I claim a cross-cut saw formed with groups of diamond or scoring teeth, c c, and chisel teeth, d d, standing in one direction, and with notches between said groups of teeth, as and for the purposes specified.

71,228.—CARRIAGE TOP PROP.—Anson Searls, San Francisco. Cal.

I claim, 1st, The tubular joint bar standard, B.

2d, The clamp or claw, or equivalent.

3d, The screw bolt, C, that passes through the joint bar standard, B, and a part of the clamp, holding them firmly together and in position.

4th, The combination of the joint bar standard, B, with the clamp, A, in combination with the screw, C, for the purposes substantially as described.

71,229.—MANUFACTURE OF BRICKS, RETORTS, MUFFLES, CRUCIBLES, ETC.—Edward L. Seymour, New York city.

I claim the employment of pulverized emery in combination with any one or more of the materials aforenamed, for the purpose specified.

71,230.—MANUFACTURE OF CAST STEEL.—Edward L. Seymour, New York city.

I claim, 1st. The conversion of the non-magnetic peroxides and carbonates into magnetic oxides of iron, in the manner and for the purposes specified.

2d, The metallization of iron ores at a red heat, without fusion of the particles, and for the purposes stated.

3d, The fusion of the metallized matter as described and for the purposes explained in the specification.

71,231.—APPARATUS FOR MIXING MORTAR FOR MAKING BUILDING BLOCKS, ETC.—John Shelley, Harlem, N. Y.

I claim, 1st, The stationary hollow pipe, E, passing through the trunnions, b b, and extending longitudinally through the center of the cylinder, A, to which the water and steam pipes are both connected, the same being provided with holes or outlets on the under side, as herein described.

2d, In combination with the stationary pipe, E, the arms, i i i i, and scrapers or blades, I I, the revolving cylinder, A, operating in the manner as here in described, for the purpose set forth.

3d The arrangement of the water tanks, G G, the connecting water and steam pipes, H H, with their stop cocks, h h, placed at one or at both ends of the revolving cylinder, so that both steam and water may be alternately introduced into the mixture, substantially in the manner as herein set forth.

71,232.—KITE FRAME.—Josiah Shepard, New Britain, Conn.

I claim, 1st, The construction of land sides of plows with flanges in the form herein described, and for the purposes herein mentioned,

2d, The construction of plow colters with an inward curve above that part which cleaves the ground, in the form herein described and for the purposes herein mentioned.

71,235.—KEY-HOLE GUARD FOR DOOR LOCKS.—Simon Shloss, Florence Veerkam, and Chas. F. Leopold, Philadelphia Pa.

We claim, 1st, A case, A, with its projection, a, cap, B, segmental plate, D, and piece, d, the whole being constructed for attachment to a lock, and for operating substantially as and for the purpose herein set forth.

2d, The combination of the shoulders or stops, e and f, of the case, A, with the lugs, i an i', of the cap, B, for the purpose specified.

3d, The combination, supstantially as described, of the cap, B, and its lugs, i and i', with the segmental plate, D, for the purpose herein set forth.

4th, The lugs, i and i', of the cap, B, for guiding the key, F, as set forth.

71,236.—COFFEE-POT.—J. B. Smith, Milwaukee, Wis.

I claim a coffee-pot, consisting of the inner vessel, B, and the ourer vessel, A, with a water space between them, united at their top by an annular plate, having an opeuing, G, at the rear side only for the introduction of water, substantially as described.

71,237.—COFFEE-POT.—J. B. Smith, Milwaukee, Wis.

I claim, 1st, Shield, H, in combination with double coffee-pot, A and B, and handle, F, substantially as and for the purpose described.

2d, Double coffee-pot, A and B, with opening, G, shield, H, and covers, C and E, combined and arranged as described.

71,238.—BROOM HEAD.—Levi S. Smith (assignor to himself and Joseph V. Winemiller), Gorsuch's Mills, Md.

I claim the cap or socket, A, in combination with the links, G G, cross head, H, and screw, B, substantially as described for the purpose set forth.

And, in combination with the links, the clamping blocks and screws.

71,239.—SEALING FRUIT CANS.—Charles F. Spencer, Rochester, N. Y.

I claim the combination of the lead or equivalent seal with the countersunk or depressed seat, as and for the purpose set forth.

71,240.—VEHICLES.—Stephen J. Spencer, Yorkshire, N. Y.

I claim plates, D D, secured to the bottom of the box or body, and the rods, E E, connected to the upper portion of the springs, when used substantially as and for the purpose set forth.

71,241.—CAR AXLE BOX.—T. B. Stewart, Wethersfield, Conn.

I claim, 1st, The combination of the tubes, B and C, with flanges, a and b, arranged upon the box and wheel, substantially as herein shown.

2d, The crescent-shaped saddles, f, having tenons, g g g, upon their outer surfaces, and cavities, h h h, on their inner surfaces, arranged substantially as shown.

71,242.—LAMP.—Cornelius St. John, Charlestown, Mass.

I claim the combination, with the base and wick tube of a lamp burner, of the cylindrical chimney-rest and supporter, A, of wood, or other suitable material which is a non-conductor of heat, substantially in the manner and for the purpose herein shown and specified.

Also, the combination, with the wick tube and base of the burner, of the chimney-rest, A, deflector, e, and perforated plates, by which said chimney-rest and deflector are supported and held in position with relation to the wick tube, substantially as herein shown and set forth.

Also, the adjustable spring, applied to the side of the burner, for sustaining the chimney in place, essentially as set forth.

Also, the peculiar arrangement and application of the wick elevating shafts, i k, essentially as herein shown and described, and productive of advantages as explained.

71,243.—MACHINE FOR HEADING BOLTS.—Wilber Swathel (assignor to W. J. Clark, H. H. Clark, and C. H. Clark), Southington, Conn.

I claim, 1st, In bolt machines, the two independent clappers G and L, and the two separate projections, B1 B2, on the shaft, B, and the wedge piece, E, arranged as represented, so as to operate relatively to each other and to the header and moving die, substantially as and for the purposes herein set forth.

2d, Holding the header and slide, K, forward, while the clapper, L, rises, by the catch, M, or its equivalent, arranged and operating substantially in the manner and for the purpose herein specified.

71,244.—AIR HEATING FURNACE.—John M. Thatcher, Bergen, N. J.

I claim, 1st, In combination with the fire-pot, a central feeding funnel, in the form of two hollow frustra, of cones, united together at their smallest ends, substantially as described.

2d, The clinker cleaning passage, from and through the furnace front, to and into the fire-pot, inclosed by the plate connected with the fire-pot, furnace front, and ash pit, so as to prevent communication with the hot air chamber, surrounding the fire-pot, substantially as described.

3d, In combination with the clinker cleaning passage, the downward passage leading therefrom to the ash pit, substantially as described.

4th, in combination with the ash pit, grate, and downward passage, leading from the clinker cleaning passage-way, and sifting grate having a perforated bottom, extending forward of the grate bars, and across underneath said downward passage, substantially as described.

5th, The sliding dead plate or front bearer to the grate, in combination with the grate and downward passage, substantially as described.

6th, The combination of the corrugated bottom plate of the flue passage from the fire-pot to the chimney, with the air heating tubes which pass through said passage, which tubes are arranged in rows, and joined to the corrugated plate upon the ridges or V-parts of said plate, which project up into the flue passage, whereby the ashes or other solid matter coming from the fire-pot is prevented from accumulating between the tubes of each row, and forced to accumulate in the grooves or depressed portion of the corrugated bottom plate, between the several rows of tubes, thus affording facility for cleaning the bottom plate and increasing the heating surface, substantially as described.

7th, in combination with the flue passage, p, and vertical air heating tubes, the cleaning passage leading from the rear of said flue passage, of the full width thereof, to and through the rear wall surrounding the furnace, substantially as and for the purposes described,

8th, The combination of the flue passage, increasing in depth, with air heating tubes increasing in length, in proportion to their distance from the fire-pot, whereby greater tubular air heating surface is obtained to compensate for diminished heat, substantially as described.

9th, In combination with the flue passage and vertical air heating tubes, the two connecting flues which connect said flue passage with the main flue, leading from the chimney, said two flues connecting with the flue passage on opposite sides, and near the bottom thereof, substantially as described.

71,245.—ORGAN BELLOWS.—Elihu H, Thomas, Jr. (assignor to J. Estey & Co.), Brattleboro, Vt.

I claim the combination and arrangement of the sector and its hinge, with the strap, the pedal, the bellows, and its operative spring, the whole being substantially as specified.

71,246.—ABDOMINAL SUPPORTER.—Jared Thompson, Milwaukee, Wis.

I claim the adjustable pads, h h, attached to the bar, g, substantially in the manner described and for the purpose set forth.

The abdominal pad, e, provided with the loop, l, and its set-screw, d, the the supporting wire, c, provided with a spring case, b, and the pessary, a, when constructed and arranged as set forth.

I also claim the attaching to the bar above described, two springs, for the purpose and in the manner substantially as above set forth.

71,247.—CAR WHEEL.—Samuel A. Traugh (assignor to himself and Jeptha Garrard), Cincinnati, Ohio.

I claim a cast-wheel, whose web is composed of the undulating scrolls or convolutions, A, formed and arranged as and for the purpose described.

71,248.—LAMP.—Charles N. Tyler, Buffalo, N. Y.

I claim, 1st, The combination wick, W X, consisting of a supply wick, combined with two or more combustion wicks, by means of a braided or other covering, substantially as and for the purposes set forth.

2d, The wick tube, A, when flared and grooved, and provided with openings, o, substantially as and for the purposes set fortb.

3d, The combination of the wick, W X, and the wick tube, A, substantially as and for the purposes set forth.

4th, Arranging the combination wick so as to leave a space, s, between the top of the supply wick and the top of the burner, substantially as described.

71,249.—SNOW PLOW.—Peter Vonlackum, Elba, Minn.

I claim, 1st, The snow plow, consisting of the front incline, C, the double concave wings, D, and the cutting bars, a, b, and d, all constructed and arranged to operate as and for the purpose set forth.

2d, The wheels, E, when provided with the corrugated flange, as herein showne and described.

71,250.—HAY LOADER.—Albert Vose, Pittsfield, Vt.

I claim, 1st, The combination of the sliding shaft, a, and spring, g, substantially as and for the purposes set forth.

2d, Also, the combination of the sliding shaft, a, provided with a toothed segment, u, cogged wheel, A, spring, g, and lever, f, substantially as and for the purposes set forth.

3d, Also, the lifting arm, h, or its equivalent, when the same is adjustable laterally, substantially as and for the purpose set forth.

4th, Also, the lifting arm, h, pivoted to the elevating shaft, a, substantially as and for the purpose set forth.

5th, Also, the combination of the pivoted lifting-arm, h, pivoted brace, i, and shaft, a, substantially as and for the purpose set forth.

6th, Also, the combination of the shaft, a, arm, x, and cord, w, substantially as and for the purposes set forth.

7th, Also, the combination of the lifting-arm, h, or its equivalent, and an elevated fork, n, pivoted thereto, substantially as and for the purpose set forth.

8th, Also, a combination of a laterally adjustable lifting-arm, h, and an elevated fork, n, pivoted thereto, substantially as and for the purposes set foth.

9th, Also, the combination of a laterally adjustable lifting-arm, h, and a vertically adjusting arm, i, attached thereto, and supporting the fork, n, substantially as and for the purposes set forth.

10th, Also, an elevating fork, n, as connected to its lifting-arm, h, that it may be readily detached therefrom, for the purpose of unloading the hay, substantially as described.

11th, Also, the combination of the forked arm, 5, block or plate, o, and nuts, 7, 7, substantially as and for the purpose set forth.

12th, Also, the combination of the notched sliding bar, r, tines, n, guides and pawl, s, substantially as described.

13th, Also, the automatic tripping device, v, consisting of the arm, v, on the lifting-arm, h, and the pivoted pawl-lever, s, on the pivoted fork, n arranged and operated substantially as described.

71,251.—WATER GRATE FOR FURNACES.—Robert L. Walker, Globe Village, Mass.

I claim a water grate, made with the passage into and through its middle bar, and with the two serpentine passages, a a, leading from one end of such bar in opposite directions, and through the other bars, as specified.

Also, a water grate, as made not only with the passage into and through its middle bar, and with two serpentine passages, a a, leading from one end of such bar in opposite directions, through the other bars, but with a common transverse passage, e, provided with a discharge opening, f, as described.

71,252.—ENVELOPE MACHINE.—Thomas V. Waymoth, New York city.

I claim, 1st, Attaching the wing used for folding the seal flap of envelopes to the machine or frame at a lower level than the upper surface of the bottom of the folding press, for the purpose set forth.

2d, So arranging the front wing, a, called the seal-flap wing, in combination with folding press, by means of the adjustable stop, f, or any suitable device, that such wing can be turned upon the press at different angles, or can stand vertically, as desired.

3d, The arrangement and combination, substantially as described, with the plunger, B, and folding press, C, of the projecting lines, m n, and grooves, l o, for the purpose set forth.

4th, The combination with the plunger, B, and folding-press, C, substantially as described, of the roughened surface, p, and yielding cushion, q, for the purposes set forth.

71,253.—GRATE.—Marshall D. Wellman, Allegheny City, Pa.

I claim the agitators, C C, constructed as described, and secured between the spaces in the grate, B, with its projections, e e, the whole being constructed and operating in the manner substantially as and for the purposes specified.

71,254.—TRUNK HINGE.—Lucius Wheaton, Auburn, N. Y.

I claim the upper part, A, provided with slot, e, in combination with lower part, B, when both are constructed and hinged, substantially in the manner specified.

71,255.—HARVESTER.—Wm. N. Whiteley, Springfield, O.

I claim, 1st, A projecting stop-pin, H, or its equivalent, on the pitman, which, when folding the cutter-bar, will come in contact with a stationary part of the guide-bar or shoe, and prevent the knife from running out of the shoe, as set forth.

2d, A plate, J, secured at one end to the pitman, and placed between the under and jam-nuts on a clamping bolt, as and for the purposes described and set forth.

3d, In combination with the pitman, A, of a harvesting machine, the solid ring head, L, as and for the purpose described.

71,256.—MANUFACTURE OF PHOSPHATE OF SODA AND OTHER PRODUCTS.—Charles P. Williams (assignor to himself and George T. Lewis), Philadelphia, Pa.

I claim the art or manufacture of the phosphate of soda and other phosphates by the process or method herein shown and described.

71,257.—HARVESTER GUARD FINGER.—William A. Wood, Hoosick Falls, N. Y.

I claim, 1st, Inserting in the main body of a guard finger for a harvesting machine a piece of metal, harder than the main body of the guard-finger, when the piece so inserted shall form the enteing guard cap, and also a complete lining to the cutting cavity through which the cutters vibrate.

2d, Constructing a guard finger with lips, h h, in combination with the hardened piece, b, or their equivalents, substantially as and for the purpose set forth.

71,258.—SLEEPING CAR.—Jonah Woodruff, Pittsburgh, Pa.

I claim, 1st, A double couch or berth for the upper tier in a sleeping car, consisting of two leaves so hinged together that the outer leaf folds upward, and the inner leaf, being attached to the side of the car by hangers, c c, so that the couch thus formed may be folded and swung up toward the roof of the car, substantially as hereinbefore described.

2d, A detached and removable partition, m, when so constructed as to divide the space occupied by the berths of a sleeping car into separate compartments at night, and to be removable by day so as to permit the free passage of air through the car, substantially as and for the purposes herein before set forth.

71,259.—MACHINE FOR CUTTING AND PUNCHING FLYNET STRAPS.—Josiah Yeager, Berrysburg, Pa.

I claim, 1st, The construction of the knives or cutters, e, with the inclined cutting edge, substantially as described.

2d, The adjustment of the cutter bit or stock, by means of the lever, as described.

3d, The manner of securing the knives and spacing keys by means of set screws and wedges, as described.

4th, The two punches, f f, arranged in the bit or stock, and secured therein by set screw, as described, for punching the holes in the strap in pairs, as set forth.

5th, The metal bed plate, F, adapted to receive the perforated guides for various sized straps, substantially as and for the purpose set forth.

71,260.—GRATE, FIREPLACE, AND FURNACE.—Wm. Young, London, England.

I claim the application to grates, fireplaces, and furnaces, of spiral bars, adapted for the double purpose of feeding and raising the fuel to the fire, and admitting air to the fuel, as described.

REISSUES.

2,799.—ELEVATED RAILWAY.—P. Andrew, Cincinnati, Ohio.

I claim, 1st The construction and arrangement of a quadruple track upon a single row of pillars, provided with cross arms for suspending and supporting the track, substantially as set forth.

2d, Also, the arrangement of the guide rails, E E, to obviate the necessity of using flanges on the car wheels, and to prevent the cars being thrown from the track, in the manner and for the purpose herein set forth.

3d, Also, the arrangement and combination of bars, K and L, fulcrum-piece M', connecting rod, M, for holding propelling rope firmly against groove of wheel.

4th, Also, a succession of endless ropes for propelling street cars.

5th, Also, the combination gear apparatus, O P Q Q' Q'', as described, for attaching and detaching cars from the propelling ropes.

6th, The arrangement and combination of wheel, S, and band, T, as described and for the purposes set forth.

7th, Also, supporting the rails of the track by means of truss rods, X, substantially as set forth, but I do not claim the truss rods except as a support for the rails of an elevated railway.

2,800.—HARVESTER RAKE.—Chas. F. Davis, Auburn, N. Y.

I claim the combination of a stop lever, L, controlled by the driver, with the hinged rake head, and so arranged that the driver can, at pleasure, by moving the stop lever out or in, change the heads from rakes to beaters, and from beaters to rakes, for the purpose of controlling the size of the gavels, substantially as set forth.

Also, in combination with the rake head of a combined rake and reel that is thrown out of action by the operator riding on the machine, a mechanism by which it is automatically thrown again into action, substantially as described and represented.

2,801.—SEALING PRESER E CANS.—Henry S. Fisher, Newburg, Pa.

I claim, 1st, A self-adhesive seal which is prepared either in the form of a sheet, ring, disk, or piece of any required size or shape, and composed of paper which is thoroughly saturated and coated on its surface with a cement composed of the within-described substances, or the respective equivalents thereof, substantially as described and for the purpose specified.

2d, A self-adhesive seal, which is composed of paper thoroughly saturated and coated with a rosin cement, and afterward subjected to considerable pressure, so as to adapt the seal for hermetically closing preserving vessels, substantially as described.

3d, A seal which is composed of paper and cement, in combination with a compressing and retaining device, C, or its equivalent, substantially as and for the purposes described.

2,802.—STUMP EXTRACTOR.—Isaac Hicks, Hartford, Wis.

I claim, 1st, Shaft, B, pulley, C, bar, E, with its hanging fulcrum, ropes, or chains, D D, strap, F, and band, I, in combination, substantially as described.

2d, Frames, J, and wheels, o, in combination, substantially as described.

2,803.—MACHINE FOR CUTTING PAPER.—Hervey Law, Chatham, N. J.

I claim the combination of the rising and falling platform, C, and clamp frame, E, operating to clamp the paper or book as the platform rises, and to unclamp the same as the platform descends, by means of single or double cams or toggles, F F, having cranks, G G, connected with them, the pintles of which work in curved grooves, or otherwise actuated by any well-known and mechanical device, substantially as and for the purpose herein shown and described.

2,804.—HAND TRUCK.—P. H. Humes, Watson's Salt Creek, Ill., assignor to William C. Rentgen, Keokuk, Iowa.

I claim the curved parts or ends, a a, of the truck, with or without the auxiliary wheels, b b, in combination with the curved removable holding and stop bar, D, made either of a single piece or divided at its extremity, substantially as and for the purpose set forth.

DESIGNS.

2,831.—PRINTER'S TYPE.—David Bruce, Brooklyn, assignor to David Wolfe Bruce, New York city.

2,832.—PRINTEER'S TYPE.—Julius Herriet (assignor to David Wolfe Bruce), New York city.

2,833.—ORNAMENTAL TYPE.—Edwin Charles Ruthven, Philadelphia, Pa.

2,834.—TRDE MARK.—Joseph Scholfield, Constantine, Mich.

2,835.—SATCHEL.—R. M. Seldis, New York city.

2,836.—SEWING MACHINE.—W. G. Wilson, Cleveland, Ohio.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

21,576.—LAMP.—Rufus Spaulding Merrill and William Carleton, Boston, Mass., assignees of Christian Reichmann, Philadelphia, Pa., ated Sept. 21, 1858. Application for reissue received and filed Oct. 11, 1867.

1st, We claim a lamp burner in which the parts are arranged substantially as described so as to allow the light to pass out or be reflected from beneath or from the under side of dome or reflector, substantially as set forth.

2d, A lamp burner in which the deflector and other parts contiguous to or adjoining the flame are raised above and removed from contact with the base of the burner, substantially as and for the purposes herein specified.

3d, In combination with the lamp the slotted open dome or deflector when so constructed, arranged and operating as to allow the light to be deflected downward, substantially in the manner and for the purpose herein set forth and explained.

4th, The combination of the deflector and other parts surrounding the upper end of the wick tube with a sliding or adjustable sleeve mounted upon said tube under such an arrangement that the said sleeve and the deflector and other parts which it carries may be readily removed from or applied to the wick tube, as and for the purposes set forth.

5th, A deflector or dome constructed as herein described, that is to say, provided at its base with a series of peripheral springs for steadying and supporting the lamp chimney, substantially as set forth.

6th, The combination with the dome or deflector of a series of arms projecting from the periphery of said deflector and arranged as herein described so as to constitute both the seat or rest for the lamp chimney and the springs by which the said chimney is steadied and held in position, substantially as set forth.

66,498.—FIRE ANNIHILATOR.—Charles T. Jerome, Minneapolis, Minn. Dated July 9, 1867. Application for reissue received and filed Nov. 7, 1867.

1st, I claim the application of a quick match, or its equivalent, which will take fire at a low temperature to an apparatus for extinguishing fires by the infection upon the same of a gaseous or a liquid non-supporter of combustion, substantially as described.

2d, Preparing the ends of the quick matches with a composition composed of the within-described ingredients mixed together in about the proportions set forth.

45,389.—HEATING APPARATUS.—Thomas S. Clogston, Boston, Mass. Dated Dec. 13, 1864. Application for reissue received and filed Oct. 31, 1867.

I claim the application and use for heating purposes of one or more tubes having a corregated or annular ribbed surface in combination with a boiler or other suitable steam generator and pipes for conducting the steam or hot water from said generator to the corrugated tubes, essentially as herein shown and described.

18,175.—TYPE SETTING AND DISTRIBUTING MACHINE.—The Alden Type Setting and Distributing Company (assignees by mesne assignments of Timothy Alden), New York city. Dated Sept. 15, 1857. Application for reissue received and filed Nov. 8, 1867.

1st, We claim the revolving carrier wheel, J, provided with suitable conveyors or gripping devices capable of taking hold of a type and carrying the same from one channel to another, substantially as set forth.

2d, The method substantially as described for conveying the type to and from the type cases and the composing and setting tables consisting of a type carrier in combination with a series of conveyors which are capable of receiving any type indiscriminately and also of receiving an indication representing the type so received or that required whereby that type may be deposited into or taken from the type cases, substantially as set forth.

3d, The ring, f4, supported by suitable bearers or friction rollers in combination with the carrier wheel, J, and stationary shaft, k9, substantially as and for the purposes described.

4th, The herein-described or any equivalent method of attaching the conveyors to the carrier wheel by which they are permitted to stop while delivering or receiving type without arresting the motion of said carrier, substantially as set forth.

5th, Giving to the gripping end of the conveyer a motion from and toward the center of the carrier wheel whereby said gripping end is made to closely approach the place at which the conveyer is to receive or deposit a type for the purposes and in the manner substantially as described.

6th, The mechanism for gripping the type consisting of the projection or lip, g5, and bolt, o, substantially as set forth.

7th, The foot, g5, on the conveyers for supporting the type, substantially as described.

8th, The cam, u5, and lever, t5, whereby the gripping bolt, o, is withdrawn and made to release the type, substantially as described.

9th, The latch, v5, and notch, x5, in the bolt, o, to retain said bolt open, substantially as set forth.

10th, The pin, y6, on the carrying wheel to throw back the latch and release the bolt, o, substantially as described.

11th, The pusher, b6, on the conveyer to discharge the type from the grippers, substantially as set forth.

12th, The cam, d6, on the carrier wheel, J, to give motion to the pusher, b 6, on the conveyers, substantially as described.

13th, The lever, u6, secured to a stationary fulcrum to give motion to the pusher, z5, of the setting conveyers, substantially as set forth.

14, The springs, l5, having the double function of thrusting the conveyers out and forcing them in, substantially as described.

15, The projecting piece, g6, on the conveyers and the stationary hooks, x x, for the purpose of arresting the conveyors at proper places, substantially as set forth.

16th, The adjustable indicator points, o5, on the conveyers, substantially as and for the purpose described.

17th, The bar, n6, cams, j6, and spring, o6, for carrying the conveyers to the forward ends of their slots, substantially as described.

18th, The type cases or channels, K, arranged both to receive type from and discharge it to the conveyers, substantially as described.

19th, In combination with the devices or mechanism for receiving the types into and for delivering them from the type cases, we claim arranging the types edgewise in said cases whereby for all the types of a font an uniform throw or action may be given to said mechanism.

20th, In combination with the type channels or cases the mechanism for pushing out the type consisting of the rack, pendulum lever, and propelling rod, and the pusher upon the conveyers, or any equivalent thereof, as described.

21st, In combination with the type channels the mechanism for preventing the stopping of a setting conveyor at a type channel when it is empty or a distributing conveyer at a channel when full of type consisting of the tilting bar, s7, the pendulum lever and rack, or equivalents, as described.

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22d, The rim, m7, to lift the pawl, n7, clear of the ratchet, l7, substantially as set forth.

23d. The excavated ring, m5, in combination with the conveyers and type channels, substantially as and for the purpose described.

24th, The stationary inclined pieces, g7, in combination with the grooves of the ring, m5, for restoring the indicating points upon the conveyer to a zero or starting point, as set forth.

25th, The movable indicators, c7, in combination with the grooves in the ring, m5, and with the shifting bars of the distributing mechanism, substantially as described.

26th, The channel of excess, Q, in addition to the regular type cases, k, and in combination with the conveyers, d, substantially as and for the purpose set forth.

27, The latch, j8, and pusher, b8, in combination with the channel, Q, substantially as and for the purpose described.

28th, The mechanism for feeding up the line of type consisting of the cam, w2, spring, x2, arm, a2, and disk, g2, substantially as set forth.

29th, The mechanism for feeding up the column of type and for elevating the successive lines thereof into the channel, suostantially as described.

30th, The method of engaging and disengaging the feeding pawls consisting of the hanging lever, a3, in combination with the frame, H, with the means for depressing the bolt, d3, and with the ratchet having the engaging and disengaging wedges, as described.

31st, The movable plate, d2, in the channel, a, to allow of raising the top line free of obstruction, substantially as set forth.

32d, The arrangement of type levers to act on the nicked edges of the type and produce the required set in the machine, substantially as and for the purpose described.

33d, The combination of the type levers, z3, with the distributing conveyers, substantially as and for the purpose set forth.

34th, The movable frame, y3, carrying the type levers, z3, in combination with the graduated stop, c4, substantially as and for the purpose described.

35th, The lever, i4, and apron, g4, to regulate the throw of the frame, y3, for the "thin space," substantially as set forth.

36th, The hammer, a5, to keep the type down on the bottom of the channel, a, and insure a correct operation of the levers, z3, substantially as described.

37th, The forked discharge piece, k4, to push the type off squarely upon the conveyor, substantially as set forth.

38th, The bell crank lever, e4, and pin, l4, for relieving the frame, y3, substantially as described.

39th, The arrangement of mechanism for transmitting the movements produced upon the levers, z3, by the nicks in the type and for effecting the proper combinations upon the indicators, e7, consisting of the detaining levers, n4, the bars, p4 bar, t4, bars, r4, bar, y4, and the connecting levers, g4, together with the operating cams upon the shaft, j4, or any equivalent combination, whereby the same results will be produced, as described.

40th, The follower, e10, and gage, f10, in combination with the channel, f, and galley, M, substantially as and for the purpose set forth.

41st, In combination with the keys the arrangement of mechanism whereby the separate different signals represented by each of a great number of keys may be produced by a less number of indicators, as described.

42d, The independent registering apparatus constructed as described, or its equivalent apparatus, which will effect the recording of the letters or signs as indicated by the keys independently of the type carrying apparatus, substantially as set forth.

43d, The pins, o9, placed in the rings, H9 R, of the register wheel, substantially as and for the purpose described.

44th, The stationary cam, s10, for returning the pins, o9, substantially as set forth.

45th, The radiating revolving levers, h9, in combination with the register wheel and with the keys, substantially as described.

46th, The mechanism for transmitting the indications from the register consisting of the detaining levers, k0, in combination with the setting indicators and with the register, substantially as described.

47th, The springs, g0j0, and lever, i0, in combination with the indicator bars, f0, and with the register and carrier wheel whereby the indicator bars are caused to act on the setting conveyers and immediately thereafter made to retreat previous to the passage of a distributing conveyer, substantially as set forth.

48th, The toe, c0, in combination with the radiating revolving frame, j9, stop pawl, d0, and register wheel, R, substantially as and for the purpose described.

28,105.—BASKET.—The American Basket Company, New Britain, Conn., assignees by mesne assignments of Jesse K. Park, Marlboro, N. Y. Dated May 1, 1860. Application for reissue received and filed Oct. 31, 1867.

I claim the construction of the uprights for the sides of a basket and the bottom thereof of thin laminae of wood secured crosswise and flatwise to each other without interweaving so that there are two thicknesses of the material in the bottom and a single thickness in the uprights, substantially as before set forth.

Also the combination of the said laminae attached crosswise and flatwise without interweaving with a connection at their ends, substantially as before set forth.

Also the combination of the said laminae (attached crosswise and flatwise without interweaving), with a connection at their ends and with filling inserted between the bottom and the ends of the uprights, substantially as before set forth.

Also the compound metal and wood basket rim with the wood at interior, substantially as before set forth.

39,582.—COAL STOVE.—Dennis G. Littlefied, Albany, N. Y

Dated Aug. 18, 1863. Reissue No, 1894. Dated Dec. 22, 1863. Application for reissue received and filed Nov. 11, 1867.

1st, I claim the peculiar mode and manner described of constructing the magazine consisting as it does of several parts so connected together as to combine strength, durability and perfect adaptation to their purpose and so adjusted as conveniently to admit of separation and reunion at pleasure.

2d, The devices described by means of which the several sections and segments of the magazine are held firmly together in their relative positions and the whole in its proper place.

3d, The devices described by means of which the lining of soapstone or bricks is held securely in its proper place notwithstanding the greater expansion of the iron cylinder by heat and by means of which it is protected from injury by the descending coal.

4th, The magazine constructed as described in combination with the furnace separated from it and suspended within a chamber isolated from the chamber surrounding the magazine.

5th, The combination of a magazine contracting in diameter from the middle or other line downward to its lower end with a furnace suspended within a chamber isolated from the chamber surrounding the magazine.

6th, The devices described by means of which the upper and lower sections of the burner can readily be separated and re-united without injury to either.

7th, I claim the inter-communication to be opened and closed at pleasure between the chamber of a magazine coal burner which surrounds the furnace and that which surrounds the magazine.

66,318.—GLOBE VALVE FOR STEAM ENGINES.—Joseph J. French and Reuben A. McCauley, Baltimore, Md., assignees of Joseph J. French aforesaid. Dated July 2, 1867. Application for reissue received and filed Oct. 5, 1867.

1st, I claim the solid arch, H, or its equivalent, bracket, H', in combination with and carrying the hollow screw, B, as and for the purpose set forth.

2d, The square projection, J, of the valve stem, D, made and combined substantially as and for the purpose shown and set forth.

3d, The hollow plug, F, having a screw, e, on it when combined with the arch, H, hollow screw, B, shaft, D, and body of the valve, A, as and for the purpose shown and set forth.

4th, The combination of the solid arch, H, hollow screw, B, valve shaft, D, plug, F, and body of a globe valve, A, made and arranged substantially as shown and set forth.

58,494.—GRATE BAR.—Sterry Smith, Salem, Mass. Dated Oct. 2, 1866. Application for reissue received and filed Nov. 11, 1867.

I claim a compound grate bar formed of a series of parallel longitudinal bars, H H' G G'' G''', constructed and connected together, substantially as described.

57,337.—HORSE HAY FORK.—Mary Jane Laird, Middletown, Pa., (administratrix of the estate of Andrew Laird, deceased). Dated Aug. 21, 1866. Application for reissue received and filed Nov. 12, 1867,

1st, I claim the tines, D D, having cutting eyes, 2 2, substantially as and for the purpose specified.

2d, I claim the tines, D D, having slots, d' d', so arranged that when they are operated upon by a lever or other device they will be compelled to travel so as to form the area of a circle, substantially as and for the purpose specified.

3d, I claim the tines, D D, in combination with the rod, C, having pins or pivots, d d, when the same are constructed and arranged so as to operate substantially as described.

4th, I claim the tines, D D, in combination with the rod, C, when the former are pivoted to the parallel bars, A A, and work in slots arranged in the end of the same, substantially as described and for the purpose specified.

5th, I claim the rod, C, link, E, and lever, F, when the same are arranged and combined substantially as described.

6th, The bars, A A, when they are connected and arranged as shown in combination with the rod, C, and link, E, substantially as described.

7th, In combination with the sliding rod, C, the lever, F, having its upper horizontal arm adapted to project through the ring, H, substantially as described and for the purpose specified.

68,095.—THRASHING MACHINE AND SEPARATOR.—Hugh W. Matthews, Chicago, Ill. Dated Aug. 27, 1867. Application for reissue received and filed Nov. 12, 1867.

1st, I claim a longitudinally slatted grain rack or platform, C, constructed substantially as described in combination with vertically and longitudinally moving shakers, D, arranged so as to play between the slats of said rack, substantially as described.

2d, The combination of a thrashing device, a perforated and longitudinally slatted stationary rack, C, and blades or straw shakers, D, operating substantially as described.

3d, A stationary or movable rack, C, composed of perforated slats having longitudinal spaces between them in combination with serrated blades, D, arranged and operated substantially as described.

4th, The slatted and perforated grain rack arranged so as to incline toward the thrashing device and hinged to the main box or frame, A, substantially as described.

5th, A centrally arranged longitudinal trough, J, provided with a screw conveyor, K, and two inclined planes, h h, substantially as described.

6th, The combination of a slatted rack or grain platform, C, the serrated grain or straw shakers operating through said grain rack and conveyor, arranged and operating substantially as described.

4,472.—MACHINERY FOR MAKING HAT BODIES.—Eliza Wells, Brooklyn, N. Y., administratrix of the estate of Henry A. Wells, deceased. Dated April 25, 1846. Reissue No, 396. Dated Sept. 30, 1856. Extended April 25, 1860. Reissue No. 1,087. Dated Dec. 4, 1860. Application for reissue received and filed Nov. 13, 1867.

1st, I claim the combination of the rotating brush or picker, substantially such as described, the rotating pervious cone provided with an exhausting mechanism substantially as described and the bottom plate or guide substantially as described for directing the fur fibers toward the lower part of the cone and preventing the fibers going to waste the said combination having the mode of operating specified and for the purpose set forth.

2d, The combination of the rotating brush or picker substantially as described the rotating pervious cone provided with an exhausting mechanism substantially as described and the guide or deflector for directing the fur fibers on to the tip and upper part of the cone substantially as described, the said combination having the mode of operation specified and for the purpose set forth.

3d, The combination of the rotating brush or picker, substantially as described, the rotating pervious cone provided with an exhausting mechanism substantially as described and the side guides or either of them substantially as described to prevent the fur fibers from getting out of the proper influence of the currents travelling to the cone and to protect the traveling fibers from disturbing currents, the said combination having the mode of operation specified and for the purposes set forth.

4th, The combination of the feeding apron on which the fur can be placed in separate batches as described the rotating brush or picker substantially as described the rotating pervious cone or former provided with an exhausting mechanism substantially as described, the said combination having a mode of operation substantially such as described.

5th, The combination of the feed apron on which the fur fibers can be placed in separate batches each in quantity sufficient to make one hat body the rotating brush or picker substantially as described the rotating pervious cone provided with an exhausting mechanism and the means for guiding the fur fibers substantially as described, the combination having the mode of operation specified and for the purpose set forth.

6th, The combination of the rotating brush or picker substantially as described the rotating pervious cone or former provided with an exhausting mechanism, substantially as described, and the flexible cloth, or the equivalent thereof, by means of which the cone with the batch of fur fibers can be safely removed from the machine, substantially as described.

7th, In combination with the pervious cone provided with an exhausting mechanism, substantially as described the covering cloth wet with hot water, substantially as and for the purpose specified.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,890.—APPARATUS FOR SUPERHEATING STEAM AND OTHER VAPORS.—Leffert R. Cornell, New York city. Oct. 15, 1867.

2,896.—CONSTRUCTION OF RAILWAYS AND RAILWAY CARRIAGES, AND MEANS FOR PROPELLING THE SAME.—Chas. T. Harvey, Tarrytown, N. Y. Oct. 15, 1867.

2,941.—BREECH-LOADING FIRE-ARM.—Samuel Norris, Springfield, Mass. Oct, 19, 1867.

2,971.—DREDGING AND SPICE BOXES.—George W. Putnam, Peterborough N. Y. Oct. 22, 1867.

2,981.—SINKING OR FORMING WELLS, AND APPARATUS TO BE USED.—Stephen Brewer, Cortland, N. Y. Oct. 23, 1867.

3,041.—CENTRIFUGAL MACHINE FOR SEPARATING LIQUID FROM SOLID MATTER.—David McC. Weston, Boston, Mass. Oct. 28, 1867.

EXTENSION NOTICES.

James Pitts, of Clinton, Mass., having petitioned for the extension of a patent granted to him the 28th day of February, 1854, for an improvement in cotton picker cylinders, for seven years from the expiration of said patent, which takes place on the 28th day of February, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 10th day of February next.

George W. Coats and James Russell, of Springfield, Mass., having petitioned for the extension of a patent granted to them the 1st day of August 1854, for an improvement in machines for sticking card teeth, for seven years from the expiration of said patent, which takes place on the 1st day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day April next.

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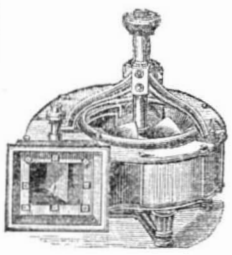

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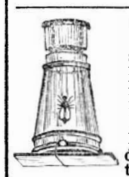

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